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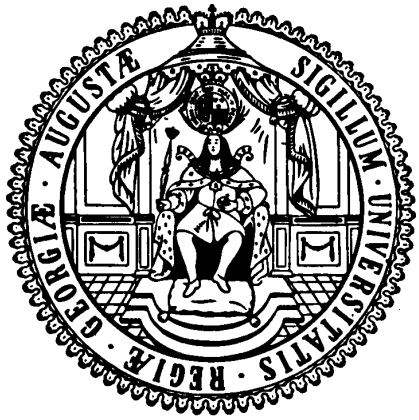

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Growth, Inequality, and Well-Being: Comparisons across Space and Time*

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Abstract

We use several well-being measures that combine average income with a measure of inequality to undertake international, intertemporal, and global comparisons of well-being. The conclusions emerging from the analysis are that our well-being measures drastically change our impression of levels of well-being of countries. They also significantly affect the ranking of countries, when compared to rankings based on real per capita incomes. These results appear not very sensitive to the data on inequality which this analysis is based upon. However, since the inclusion of inequality has an important impact on well-being comparisons, it is of great importance to generate more consistent and intertemporally as well as internationally comparable data on inequality that are necessary for such comparisons.

JEL classification: I31, D63

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1 Introduction

Despite its well-known short-comings (including well-known omissions, the neglect of stock changes, the inclusion of defensive expenditures, etc.), GNP per capita is still the most widely used indicator for comparisons of well-being across countries; and the per capita growth rate is still the most common indicator of changes in well-being.[1] The exclusive reliance on this measure is largely due to pragmatic grounds. GNP as well as GDP are important measures of production possibility and business cycles. Hence, great efforts are made to measure them timely, accurately, and according to internationally agreed standards. With these data readily available, it is tempting to rely on them for international and intertemporal comparisons of well-being. Moreover, it is argued by many that GNP per capita and growth of per capita income is still the best available proxy for changes in well-being as it is highly correlated with more complete or more broad-based measures of well-being (e.g. Dollar and Kraay, 2002; Ravallion, 1997).

Nevertheless, it continues to be the case that its neglect of income distribution is one of the most serious short-comings of GNP as an indicator of welfare. In particular, a broad range of philosophical approaches to the measurement of welfare (ranging from utilitarianism with some very reasonable assumptions about utility functions to Rawlsian reasoning or Sen's capability approach) would suggest that, ceteris paribus, high economic inequality reduces aggregate well-being. In fact, there exists a range of measures for well-being that make use of this insight and combine mean income with some measure of income inequality to arrive at better measures of welfare than average income alone (e.g. Atkinson, 1970; Sen, 1973; Dagum, 1990; Ahluwalia and Chenery, 1974).

In the past the application of those measures was limited, mainly because of lack of comparable data on income distribution.{For some applications of these measures for individual countries or groups of countries, see Jenkins (1997); Klasen (1994); Grün and Klasen (2001); Kakwani (1981). Recent years, however, have seen great advances being made in the generation of data on income inequality (e.g. Deininger and Squire, 1996; Gottschalk and Smeeding, 1997; WIID, 2000). Thus it seems natural to apply well-being measures that combine GNP per capita and income distribution to these new data and investigate to what extent these measures will generate comparisons of well-being across space and time that are substantially different from pure per capita income comparisons. While Grün and Klasen (2003) applies these measures to intertermporal and global assessments of well-being, the focus here is to undertake international comparisons of well-being for different benchmark years. Due to the use of different years, this analysis will also include an intertemporal component.

The analysis consists of three major parts. In a first step, income inequality-adjusted welfare levels are calculated using various measures for as many countries as possible in 1960, 1970, 1980, 1990, and 1998. In the *international analysis* countries are ranked according to their welfare level in both pure income based measures and inequality-adjusted welfare indicators for these different benchmark years. A comparison of country specific

[1] There are other well-being indicators that have attempted to address some of the short-comings of the GNP measure, including Nordhaus and Tobin (1972); UNDP (2002a); Osberg and Sharpe (2001); World Bank (2002b). None of these, however, are primarily concerned with tackling the distributional issue addressed here.

levels of well-being will demonstrate by how much aggregate welfare in a particular country is reduced once the unequal distribution of its income is taken into account. Looking at the welfare ranks, winners and losers can be detected, i.e. some countries will reach a higher welfare rank than their income rank and vice versa. In a second step, we then examine relative rankings of countries over time. In a third step, we will undertake a thorough sensitivity analysis to examine the robustness of our findings.

It should be pointed out at the start that this study presents results of an exercise that, to some degree, is still speculative. On the theoretical side, we are not aiming to propose definitive measures of well-being. Instead, we merely wish to illustrate how reasonable and empirically supported ways of incorporating inequality in an assessment of well-being will change the impression of well-being across space and time. On the empirical front, the conclusions should be seen as similarly tentative. While today many more data on income inequality across space and time are available, the accuracy and comparability of many of them remain open to question (see Atkinson and Brandolini, 2001; Deininger and Squire, 1996). The robustness of the results will checked by a thorough sensitivity analysis. None of this can, however, substitute for long consistent time series of internationally standardized and comparable data which are at present not available. Moreover, the international comparisons of inequality are limited by changing sample sizes and irregularly spaced data points on inequality so that it is difficult to assess changes in ranking over time. Despite these short-comings, the analysis generates a number of important and usable findings that appear to be fairly robust to most of the many data problems we encountered.

The paper is organized as follows: the next section discusses the theoretical issues involved in comparing well-being across space and time. Section 3 introduces the measures of well-being we use in the paper. Section 4 discusses the data and our manipulations for this analysis. Section 5 presents the results for the international analysis, section 6 the sensitivity analysis. Section 7 examines well-being across time, while Section 8 concludes.

2 The Theory of Well-Being and Real-Income Comparisons

Despite a long history, the theory of welfare judgements across space and time continues to be beset with conceptual and practical problems.[2] Ever since it became evident that social choice theory was not yielding acceptable[3] procedures for making social welfare judgements, such judgements have been based on axiomatic approaches to welfare measurement. Those are based on a conceptualization of what constitutes welfare and then the derivation of an indicator that, under certain stated assumptions, can adequately measure the chosen concept.

Applying such measures to welfare comparisons across space and time generates additional problems. Those are discussed in detail in Sen (1982, 1984) and will only be

[2]For a related discussion, see also Grün and Klasen (2001) and Grün and Klasen (2003).

[3]Acceptable is meant in the sense of obeying minimal requirements such as the four conditions stated by Arrow in his famous impossibility result (Arrow, 1963). See also Sen (1973, 1999) for a discussion.

summarized here. In particular, the theory of welfare comparisons is based on situational comparisons, i.e. whether a person would hypothetically prefer situation A to B. This comparison thus takes place at the same time and is done by the same person. Intertemporal or international welfare comparisons, however, address different questions. Intertemporal comparisons have to contend with the problem that the persons are not evaluating the welfare of two situations simultaneously, but sequentially. This may generate problems if overall perceptions of welfare or tastes have changed over time (in addition to the problem that not all the people are alive in both periods). Comparisons across space, as done in inter-country comparisons, are even more difficult as now the persons differ whose welfare is being compared.[4] The comparison could be made using the price (or other welfare weight) vectors of either country, which would not necessarily generate the same result.

In addition to this theoretical problem, the comparability of prices poses another problem, namely the appropriate exchange rate for international comparisons. In the past, most real income comparisons were based on official exchange rates despite the knowledge that they are often distorted as a result of speculation and currency restrictions, and that they imply a systematic undervaluation of the non-traded sector in poorer countries. In recent years, the International Comparison Programme (ICP)[5] has generated purchasing power parity estimates of GDP and GNP based on international prices that try to address these particular short-comings.[6]

Thus, there are some important conceptual questions that relate to such comparisons. Only if one places restrictions on intertemporal changes and international differences in preferences, these comparisons can yield meaningful outcomes. Given the ubiquity of such comparisons, it appears that most analysts are willing to make such assumptions.

The most commonly used indicator for welfare comparisons across space and time is real per capita income. It can be derived from utilitarian welfare economics, thus focusing on a consequentialist approach to welfare measurement, using three alternative sets of assumptions. One set would demand everyone to have identical unchanging cardinal utility functions where income (or consumption)[7] enters the utility function linearly (e.g. in the simplest form, every unit of consumption generates one unit of utility). An alternative set of assumptions could allow for more realistic concave utility functions, but would still require identical utility functions and require in addition that everyone is earning the per

[4]One could try to translate an international comparison into a situational comparison, i.e. asking the British whether they would prefer to live in Britain this year or in France this year. But this also leads to considerable problems, as it is not clear which British person should compare themselves to which French person, or whose welfare function should be used. For a discussion of those issues, see Sen (1982, 1984).

[5]The ICP produces estimates of the economies' main aggregates which are comparable across countries. Purchasing power parities are generated and used for converting the data into a common currency (UN, 1992). Unfortunately, not all countries participate in the project which had its last round of surveys in 1996, so that PPP had to be estimated based on similar countries. For a discussion, see Heston, Summers, and Aten (2002)

[6]While the data generated by these methods are widely used, they are not beyond question. In particular, the resulting adjusted per capita incomes are sensitive to the choice of 'international prices' which is closer to the prices prevailing in rich countries (Berry, Bourguignon, and Morrison, 1991; Hill, 2000). Moreover, as is revealed below, PPP adjustments can differ in their outcomes as the differences between the World Bank estimates (based on the 1993 ICP) and the Penn World Tables (based on the 1996 ICP) demonstrate.

[7]We abstract from the difficulties associated with the treatment of saving in an indicator of welfare. For a discussion, see Osberg and Sharpe (2002).

capita income and thus consumes the mean commodity bundle (Sen, 1984). A third set is based on Samuelson (1947) and takes an 'individualistic approach' to welfare measurement. Under this approach, social welfare is recovered from individual welfare based on revealed preferences using the Pareto principle. If preferences are complete, convex, and monotonically increasing, if each person's welfare only depends on her purchases (i.e. no externalities and public goods), if there are no market imperfections on the buyer's side, and if each person is rational in the sense that her choices reflect her welfare ranking, then the ratio of market prices should equal the ratio of intra-personal weights (marginal rates of substitution) attached to these goods. These assumptions are not sufficient, however, to ensure that the market prices say anything about the valuation of a good going to two different people, as this requires interpersonal comparisons. To be able to make such interpersonal comparisons, which are necessary for all real income comparisons, one has to assume in addition that the income distribution is 'optimal' in the sense that the ethical worth of each person's marginal dollar is equal (Samuelson, 1947).

All three sets of assumptions are problematic. While many aspects of the various approaches appear unrealistic, the need to *explicitly* ignore the distribution of income in a welfare comparison is particularly unpalatable. In fact, both theoretical considerations (e.g. declining marginal utility of income derived from convex preferences) as well as empirical observations (e.g. about risk aversion and insurance as well as subjective well-being) clearly suggest that utility functions are not linear in income or consumption, nor that the existing distribution of incomes is 'optimal' from a social welfare point of view.[8] Instead, these theoretical and empirical considerations point to concave utility functions, i.e. inequality reduces aggregate welfare as the marginal utility of income among the poor is much higher than among the rich.[9]

Non-utilitarian views of welfare would also suggest that income inequality reduces aggregate well-being. For example, Sen's capability approach (Sen, 1987) which calls for a maximisation of people's capability to function (e.g. the capability to be healthy, well-nourished, adequately housed, etc.) also exhibits declining marginal returns in the income space.[10] Similarly, application of Rawlsian principles would also suggest that welfare is higher in societies where inequality is lower (Rawls, 1971).[11]

One approach to improve upon the welfare content of real income comparisons is therefore to jettison this neglect of income distribution and incorporate the notion of

[8]See for example Alesina, Di Tella, and MacCulloch (2002) who show with the help of U.S. happiness data and the Euro-Barometer Survey Series that income inequality negatively affects the utility level of individuals, even though personal characteristics like individual income are controlled for. For similar findings, see Blanchflower and Oswald (2003); Schwarze and Härpfer (2002)

[9]This is inherent also in the approach by Graaf (1957) and Sen (1982) who treat the same good going to two different people as two different goods and thus explicitly do away with the distinction between size and distribution of income as the 'welfare depends on them both' (Sen, 1982).

[10]For example, there appears to be a concave relationship between income and life expectancy, and income and educational achievement. For a discussion, see Klasen (1994).

[11]In the lexicographic version of the maximin principle, only the position of the worst off is relevant; if one generalises a bit, one would get a more continuous declining marginal valuation of income. Similarly, Hirsch's views on the social limits to growth also imply declining aggregate well-being as a result of inequality. For details see Hirsch (1977) and Klasen (1994).

declining marginal welfare returns of income.[12] Each of the measures proposed in the next chapter does precisely this in slightly different ways.

Before turning to this issue, however, it seems useful to consider one explicit objection to the incorporation of distributional issues in an assessment of well-being. It could be argued that higher inequality will lead to higher subsequent growth rates, so that one should explicitly consider this trade-off in a welfare assessment. The reason for such trade-off might be related to higher inequality promoting savings [13] or to the incentive problems associated with redistribution policies (often relying on progressive taxation of labor earnings and profits).

While this is a potentially powerful argument, it is just one of many dynamic considerations that would need to be considered in an inter-temporal assessment of well-being. Other issues to be considered in such an inter-temporal assessment would include the role of savings, longevity, human capital accumulation, population dynamics, depreciation of natural, physical, and human capital.[14] These issues go beyond the scope of this paper which concentrates on a static assessment of well-being at a certain point in time.[15]

In addition, there is a growing consensus that this trade-off between distribution and growth does not exist. In fact, if anything, the debate has recently shifted in the opposite direction suggesting that initial inequality lowers subsequent growth prospects rather than increases them (e.g. Deininger and Squire, 1998; Alesina and Rodrik, 1994; Clarke, 1995; Persson and Tabellini, 1994; Klasen, 2002). While these findings are still tentative and subject to some debate,[16] they suggest that the older claim, that high inequality is necessary for growth, does not seem to be born out by the facts (see also Klasen, 1994).

3 The Well-Being Measures Used

This section describes some measures that jointly consider per capita income and its distribution and therefore avoid the particularly problematic neglect of income distribution in a consideration of welfare. Most are well-known in the inequality literature although

[12] This approach would also retain the consequentialist logic of the utilitarian calculus which evaluates a state of affairs by the consequences it generates, with no emphasis on procedural issues. One might argue, however, that it is important to consider inequality also for procedural questions as high inequality effectively limits the choices for those at the bottom of the distribution. For a discussion, see Sen (1999).

[13] Assuming a Keynesian consumption function, a more unequal distribution of income leads to higher aggregate savings which is one of the main determinants of per capita income (and, at least in the short run, the growth thereof) in any growth model.

[14] For a discussion of some of these issues, see for example World Bank (2002b); Berry, Bourguignon, and Morrison (1991)

[15] Thus we will also not be able to deal with the potentially interesting but conceptually and empirically very difficult issue of life-time incomes and its distribution, which has to take into account both the life-time income profile of incomes as well as an assessment of the distribution of longevity.

[16] See, for example, Forbes (2000) and Lundberg and Squire (2001). The last-named regard growth and income inequality as jointly determined rather than one causing the other; they also find that inequality is particularly bad for income growth among poor countries, while it has a different effect for income growth among richer countries; the former study finds that increases in income inequality in a country appear to be correlated with higher growth in the subsequent five years, but there are serious questions about the reliability of making inferences based on the small and error-prone intertemporal variation of inequality data within a country over time.

not all of them have been used explicitly for aggregate welfare comparisons. All share the feature that they can be summarized by the following formula:

$$W = \mu(1 - I), \qquad 0 \leq I \leq 1. \tag{1}$$

Welfare W is a function of mean income μ, reduced by a measure of inequality I. Thus, the existing degree of inequality adjusts mean income downward to reflect the welfare loss associated with the (unequal) distribution of that mean income. Several measures will be considered because there are on the one hand differences with respect to the intensity of 'welfare penalty' that is imposed for inequality. On the other hand the measures vary in the way they penalize different types of inequality.

The first measure considered here was proposed by Sen (1982) and incorporates inequality by using the Gini coefficient G:

$$S = \mu(1 - G). \tag{2}$$

The Sen measure can be derived by replacing Samuelson's problematic 'optimal distribution' assumption by the assumption of 'rank order weighting' (Sen, 1973). Individual incomes will be weighted according to their rank in the income distribution (with the richest person receiving rank 1 and thus the lowest weight for her income). It can also be derived from a utility function where individuals consider not only their own income, but the entire income distribution, with particular emphasis on the number of people with incomes below or above one's own (Dagum, 1990). Thus, preferences are assumed to be interdependent which accords well with recent experimental and empirical findings on inequality aversion and the link between income distribution and reported well-being (e.g. Easterlin, 1995; Banerjee, 1997; Amiel, Creedy, and Hurn, 1999; Blanchflower and Oswald, 2003; Schwarze and Härpfer, 2002; Alesina, Di Tella, and MacCulloch, 2002). The measure also has a nice graphical illustration. As discussed by Sen (1997), it represents twice the area below the generalized Lorenz Curve (which in turn is the Lorenz curve scaled up by mean income).

A variant of this measure was proposed by Dagum (1990):

$$D = \frac{\mu(1 - G)}{1 + G} = \mu(1 - \frac{2G}{1 + G}). \tag{3}$$

Clearly, the Dagum measure is a more extreme version of the Sen measure as it results in a higher penalty because of the denominator which imposes an additional punishment for inequality. The Dagum measure is also based on interdependent preferences and implies that people receive a further welfare penalty from the people ahead of them in the income distribution which also appears to be a reasonable assumption.[17]

In addition, two versions of the Atkinson welfare measure are presented. The Atkinson measure was developed as an indicator of inequality that explicitly considers the welfare loss associated with inequality in the measure (Atkinson, 1970). But one can equally well just use the way the welfare loss is calculated, the *equally distributed equivalent income*,

[17]See Dagum (1990) for a derivation and justification of this measure.

as the welfare measure itself.[18] This equally distributed equivalent income is the amount of income that, if distributed equally, would yield the same welfare as the actual mean income and its present (unequal) distribution (Deaton, 1997). The general form of this measure is given in equation (4):[19]

$$A2 = \left[\frac{1}{N}\sum_{i=1}^{N} x_i^{1-\varepsilon}\right]^{\frac{1}{1-\varepsilon}}. \tag{4}$$

The measure depends crucially on the exponent ε, the *aversion to inequality factor*. The higher ε, the higher the penalty for inequality. Two cases are studied explicitly, $\varepsilon = 2$, denoted as $A2$, and $\varepsilon = 1$ ($A1$). In the latter case, the general form of the Atkinson measure is not defined and changes to:

$$ln(A1) = \frac{1}{N}\sum_{i=1}^{N} ln(x_i). \tag{5}$$

The Atkinson measures can be derived from social welfare functions that are additively separable functions of the individual incomes x_i. Thus they are based on individualistic utility functions where people only care about their own incomes. Inequality reduces welfare in this formulation as the utility functions considered are concave for all $\varepsilon > 0$. All the measures exhibit constant relative risk aversion. The $\varepsilon = 1$ has the additional property of being based on a constant elasticity utility function, suggesting that a percentage increase in income is valued the same regardless of its recipient. Such an assumption has quite a lot of intuitive appeal. While clearly $\varepsilon = 2$ penalises inequality more than $\varepsilon = 1$ and is thus based on declining elasticity of income, the underlying assumption, that at twice the level of income, a percentage increase in income is valued half as much as at the lower level of income, also appears to be within the range of reasonable presumptions (see Deaton, 1997; UNDP, 1995). Such penalties of inequality are still consistent with findings from the micro literature on utility and risk.[20] Most of the non-utilitarian theories suggested above would, in fact, require considerably higher inequality aversion.[21]

Before turning to the data and the results, it is important to briefly discuss the most important differences between the measures.[22] Apart from the size of the penalty applied to inequality, the two Gini-based measures differ quite fundamentally from the two Atkinson measures (and thus the Ahluwalia and Chenery measures) in ways that are important to consider. As is already stated above, the Atkinson measures only consider individual incomes in an assessment of well-being while the Sen and Dagum measures consider relative incomes, i.e. the income distribution itself has a separate impact on well-being

[18] This has been done, for example, for Britain by Jenkins (1997) and also by UNDP in deriving the gender-related development index (UNDP, 1995). For a discussion of this index, see Bardhan and Klasen (1999).

[19] This measure also satisfies the general form of the well-being measure $W = \mu(1-I)$ where $I = \frac{1-A}{\mu}$. See Atkinson (1970) for discussion.

[20] For different ways to measure inequality aversion and their results, see Stodder (1991); Amiel, Creedy, and Hurn (1999). See also discussion below.

[21] A strict interpretation of Rawls lexicographic maximin principle would require ε to be infinite (see also Atkinson, 1970).

[22] For a more extensive discussion of these issues, refer to Atkinson (1970), Blackorby and Donaldson (1978), Sen (1997) and Dagum (1990).

(apart from its impact on the levels of individual incomes). As a result, the two groups of measures obey different properties. While all measures are consistent with the Dalton principle of transfers[23], the Atkinson measures additionally obeys a condition called transfer sensitivity. An equal-sized transfer will have a larger impact on inequality (and thus on welfare) if it happens among the poorer sections of the income distribution than if it happens among richer sections (Sen, 1997). Most would agree that this is, at first blush, a desirable property. In contrast, the largest impact of an equal-sized transfer using the Gini coefficient will be among the mode of the income distribution, i.e. among middle income groups. The difference occurs as these transfers will have the largest impact on the rank of the people affected by the transfer and thus the weights attached to their incomes (see Atkinson, 1970; Blackorby and Donaldson, 1978). While many see this as an undesirable property of the Gini-based measures, there is some empirical support that such income comparisons at the mode of the distribution are indeed highly relevant for welfare assessments.[24]

Secondly, the Atkinson measures are subgroup consistent (implying that any increase in inequality in a subgroup will raise overall inequality and thus lower overall welfare), they are consistent with the Pareto principle (an increase in income of one person, holding all other incomes constant, will increase welfare) and are Generalized Lorenz Consistent (if a Generalized Lorenz Curve of a distribution is somewhere above and nowhere below the GLC of another distribution, welfare is higher in the former case). In contrast, none of the Gini-based measures are sub-group consistent and the Dagum measure additionally violates the Pareto Principle and is not Generalized Lorenz Consistent (although this only happens in rather extreme cases, see Dagum (1990)). There is some debate whether sub-group consistency is a desirable property or not. While some support it as a logically coherent requirement, others suggest that the impact of sub-group inequality on overall inequality and welfare depends heavily on the relative position of that sub-group in the overall income distribution (e.g. Sen, 1997; Dagum, 1990). Similarly, while the violation of the Pareto and Generalized Lorenz Criterion of the Dagum measure might be seen as problematic, a case can be made that such violations might be justified in extreme circumstances.[25]

While the Atkinson measures thus have more desirably theoretical properties, the experimental and empirical literature on inequality aversion and subjective well-being generally seems to find more support for the Gini-type measures.[26] Regarding the size of the penalty for inequality, there is virtual unanimity in the literature that some form of inequality aversion or declining marginal well-being return of income is empirically observed, but the size of the well-being penalty for inequality differs greatly among individual studies, ranging from values below to above the ones considered here. It appears

[23]The Dalton principle of transfers says that the value of an inequality measure must fall by a transfer from a richer person to a poorer person which does not reverse their position in the income ranking.

[24]For a recent study on these issues, see for example Graham and Pettinato (2002). Analysing data from Peru (covering the period 1985-2000) and Russia (1995-1998), they found that relative income differences seem to matter more for those in the middle of the distribution than for other income groups.

[25]For example, if the richest person in society got a bit richer, the Pareto and Generalized Lorenz Criterion suggest an improvement of welfare. One might, however, plausibly argue that everyone else is worse off due to the greater distance they now have to the richest person and that this negative effect might outweigh the positive effect of the higher mean income. For a discussion, see Dagum (1990).

[26]See for example Amiel, Creedy, and Hurn (1999); Easterlin (1995); Alesina, Di Tella, and MacCulloch (2002); Kapteyn and van Herwaarden (1980); Wansbeek and Kapteyn (1983)

that studies that are investigating the impact of inequality on subjective well-being find larger inequality aversion than those based on experiments.[27] But the range of the penalty for inequality aversion considered here is well within the range found in the experimental and empirical literature.

4 The Data

For the following analysis, the main source of data on inequality is the World Income Inequality Database version 1.0 (WIID, 2000), which provides more than 5.000 Gini coefficients and associated distributions for 151 countries. The main sources used for assembling the data set were the Deininger-Squire data (Deininger and Squire, 1996), the Luxembourg Income Study (LIS, 2000), the TransMonee Project (TransMonee, 1999) as well as other research studies and information provided by various Central Statistical Offices. To get recent data for developing countries as well as some OECD countries, Gini coefficients and income shares published by the World Bank's Poverty Monitor (World Bank, 2002a) and directly provided by LIS are added.[28] In WIID all observations are classified as either 'reliable' or 'less reliable'. Only observations which are categorised as 'reliable' and represent the entire population of a country are considered.[29] With respect to the underlying income concept, inequality data must be based on gross or net income, or on expenditures. Regarding the unit of income recipient, data based on person (or household per capita), or households are chosen. Only for few countries the analysis has to rely on data that either have been adjusted for household composition using an equivalence scale or where the income concept used and the reference unit are unknown.[30] The data are assembled for 5 benchmark years (1960, 1970, 1980, 1990, 1998). In cases where there is no data point for that particular benchmark year, the closest data point available was chosen, as shown in 1, which also shows the country acronyms used in subsequent tables.[31] In the case where several Gini coefficients with associated distributions were available for

[27] See for example Amiel, Creedy, and Hurn (1999); Blanchflower and Oswald (2003); Alesina, Di Tella, and MacCulloch (2002); Stodder (1991); Schwarze and Härpfer (2002); Kapteyn and van Herwaarden (1980).

[28] Our special thanks go to David Jesuit and Tim Smeeding for kindly providing the most recent data of several OECD countries.

[29] The quality of income inequality data provided by Deininger and Squire (1996) was already evaluated by them. If the data satisfy a minimum standard, i.e. they are based on household surveys, representative of the entire country, and a comprehensive concept of income (or expenditure) is used, they are included in the so-called 'high quality' set. Atkinson and Brandolini (2001), however, warn of the 'mechanical use' of the data. In WIID, data have been scrutinized one by one once again and the quality of the data was sometimes rated differently. Therefore, it happens that data classified as 'not accepted' and therefore not contained in the quality subset of Deininger-Squire are part of the 'reliable data set' in WIID. The opposite, that data belonging to the quality set but are categorized as 'not reliable' in WIID, is also possible.

[30] For a discussion of the use of equivalence scales in the context of welfare measurement, please refer to Atkinson, Rainwater, and Smeeding (1995), Deaton (1997), and Ayala, Martinez, and Ruiz-Huerta (2001).

[31] The greatest concessions had to be made for less developed countries like Pakistan, Panama and Chile in 1960, or for Nepal, Indonesia and Singapore in 1970. But also in case of developed countries like Finland in 1960 and 1970, or Belgium and Italy in 1970, the inequality data come from considerably later periods. For 1998, the latest available income distribution estimate has been applied which in a few cases date as far back as 1990 or 1991, but in most cases comes from the period 1993 to 1997. Combining

a particular country at a particular point in time, the observation consistent with the definition of previous or subsequent benchmark years was retained.

Ideally, one would want to at least ensure that the indicators used are based on a consistent definition of income and reference unit both across countries and time.[32] Pursuing this strategy would result in only a small number of countries and not allow a meaningful international analysis. While the main analysis deals with differing income concepts and reference units, in the sensitivity analysis, we try to generate consistent data by making suitable adjustments to base all data on unequivalized gross income per person.

Regarding income data one could consider per capita income, per capita disposable income, or per capita consumption (from national accounts of from household surveys). To get the largest possible sample and to compare ourselves directly to per capita income as the commonly used welfare indicator, we rely on per capita gross national product[33] as presented in the national accounts as the income concept used. The calculation of the well-being measures is based on purchasing power adjusted real GNP per capita provided by the Penn World Table (PWT), versions 6.1 Aten:2001. For comparative purposes, data on GNP per capita based on official exchange rates from the World Bank for all years as well as the World Bank's purchasing power adjusted GNP per capita figures[34] for the years 1980, 1990, and 1998 (WDI, 1999, 2001, 2002) will also be presented.[35]

5 International Analysis

Table 2 presents the analysis for 1960 based on the six measures used. The first two measures are per capita income, using exchange rates and PPP, respectively.[36]The next two are the Atkinson measure with $\varepsilon = 1$ and the Sen measure, exhibiting a comparatively 'mild' well-being penalty for inequality. The last two are the Atkinson ($\varepsilon = 2$) and the Dagum measures with a more heavy implied well-being penalty for inequality. The analysis is restricted to only 43 countries. Since they cover a wide spectrum of incomes, big changes in ranks can only happen when there are very drastic differences between the measures.

an income estimate from the exact benchmark year with inequality data that might come from up a few years earlier or later is done under the (implicit) assumption that changes in income distribution between adjacent years are typically smaller than changes in mean income, which is clearly born out by the countries for which we have exact data.

[32]Even if Gini coefficients are based on the same definition of income and economic unit they might not be comparable across countries, because of differences in sample methods, quality of surveys etc. (see WIID, 2000).

[33]Gross national product should better capture welfare of the population than gross domestic product as the former includes earnings from abroad and excludes earnings by foreigners. We could also rely on consumption means from household surveys, but this is unavailable for many of our data points. Also, there are large and generally not well understood discrepancies between survey means and national accounts consumption data, that differ across countries. For a discussion, see for example Ravallion (2002).

[34]The series used is GNI per capita, PPP in current international dollars. Gross national income is the "sum of value added by all resident producers plus any product taxes (less subsidies) not included in the valuation of output plus net receipts of primary income [...] from abroad" (WDI, 2002). All data taken from the World Bank were deflated to 1996 prices using the US GDP deflator (WDI, 2002) as this is the base year in PWT 6.1.

[35]To compare changes in well-being across time in a particular country, we also use real per capita GNP in local currency units, as reported in the WDI (2002)

[36]The country acronyms are explained in Table 2.

Well-being, as estimated by the various measures, falls drastically when considering inequality. Using the Atkinson ($\varepsilon = 1$) or Sen measure, well-being falls by about 10-65 per cent, and 70 (Brazil and Mexico) to nearly 80 per cent (Gabon) in the Atkinson ($\varepsilon = 2$) and Dagum measures. Compared to pure income per capita measures, existing inequality leads to major reductions in measured well-being in all the countries considered, but the size of the well-being penalty differs greatly between countries.

As expected from the discussion of inequality-adjusted measures above, there are some differences in the extent of 'penalty' for inequality, depending on the measure used. For example, Pakistan (PAK) gets penalized less by the Atkinson ($\varepsilon = 2$) measure than the Sen measure, while the reverse is the case for the Philippines (PHL). The reason is that in the Philippines the poorest do particularly badly corresponding to a heavy penalty in the Atkinson measure, while in Pakistan the middle income groups do relatively worse, which attracts the higher penalty in the Gini-based measure.

Regarding the ranking of countries, there is a considerable difference between the ranks using exchange rate and PPP, suggesting the presence of over- and undervalued exchange rates. As expected and consistent with the Balassa-Samuelson Theorem, the discrepancy between per capita income evaluated at official exchange rates and PPP is larger among poorer countries, related to the undervaluation of the non-traded sectors. Regarding ranks of countries, no assessment of inequality can dislodge the USA from the highest rank in all measures that use PPP-adjusted income, and nothing can prevent Tanzania (TZA) from being at the bottom of the list for those indicators with data being available. But there are a number of remarkable rank reversals when inequality is progressively being considered. For example, Bangladesh (BGD) and Madagascar (MDG) trade places between the pure income and the broader well-being measures. In the two income measures Madagascar is four ranks ahead; in the last two columns, Bangladesh is six and seven ranks ahead.[37] A similar reversal occurs, somewhat surprisingly, between Britain (GBR) and Sweden (SWE). Sweden is ahead in the pure income measures, while Britain is ahead in measures that also consider distribution; in fact, it mostly occupies the second highest spot in this list. This suggests that the very low inequality observed in today's Sweden was not already present in the 1960s, and the rise of Britain in the distribution-adjusted measures reminds us that Britain was among the most equal countries in Europe in 1960.[38]

Table 3 shows the rankings for 48 countries in 1970. Again, there are large differences between exchange rate based estimates of real incomes and PPP estimates, with the discrepancy being largest among poorer countries. Considering inequality continues to reduce well-being drastically. Once again, Brazil (BRA) and Gabon (GAB) are among the countries that lose most: Well-being using the Dagum measure is about 75 per cent below the level it would be if its per capita income were equally distributed. The USA is the best-off countries only when using PPP-adjusted per capita income. As soon as inequality is considered, it is surpassed by Denmark (DNK). In the Atkinson ($\varepsilon = 2$) measure, the US is additionally surpassed by the Netherlands (NLD) and Australia (AUS), suggesting

[37] Colombia is another country that also falls considerably, once PPP and inequality is considered.

[38] Gottschalk and Smeeding (2000) also report fairly high income inequality in Sweden in the 1960s, consistent with the results here. In the Luxembourg Income Study (LIS), which begins only in the 1980s, Sweden is found to be considerably more equal than Britain. The reversal occurred due to drastically rising inequality in Britain in the 1980s and a sharp drop in inequality in Sweden in the 1970s. See also the sensitivity analysis in the next chapter and Atkinson and Brandolini (2001); Grün and Klasen (2003).

that the poorest fare much worse in the US than in these two countries, thus attracting the higher penalty in the Atkinson measure. At the bottom Nepal (NPL) has the lowest well-being regardless of the measure used. Some more dramatic reversals in rank occur. Panama falls from number 26 in the exchange rate list to number 39 in Atkinson ($\varepsilon = 2$) measure. Conversely, the Philippines rises from 12 ranks below in the first column to one rank above Panama (PAN) once inequality is considered in the Atkinson ($\varepsilon = 2$) measure. Unequal Brazil trades places with more equal Korea (KOR), and now Sweden maintains its rank when inequality the Gini-based inequality measures are applied, while Britain's fall in the income rank cannot be completely compensated by its still comparatively low inequality.

Table 4 examines 58 countries for 1980. There is one more indicator, PPP adjusted income per capita from the World Bank (WDI, 2002), which is placed alongside the PPP data from the Penn World Tables. The comparison suggests the World Bank's PPP adjustment, which are based on the 1993 ICP, and the PWT's PPP adjustment, which are based on the 1996 ICP, while similar, do not come to the same results many countries. This is particularly pronounced for countries which did not participate in one or both of these exercises and where the incomes were therefore estimated. For example, China (CHN), Indonesia (IDN), Botswana (BWA), Malaysia (MYS), and Venezuela (VEN) look somewhat richer in the PPP adjustment from the Penn World Tables than in the adjustment done by the World Bank while the reverse appears to be the case for most Latin American countries (except Venezuela), the Philippines, Korea, and virtually all OECD countries.[39] Several rank changes happen as a result of these differences in the PPP adjustments. To facilitate comparisons with the earlier tables, we continue to base our inequality-adjustments on the PWT which is also likely to be more reliable as it is based on a more recent ICP survey.

The inequality-adjusted measures continue to show much lower well-being than the income measures. Brazil, Colombia (COL), and Gabon continue to suffer from the largest reductions in well-being. Due to (comparatively) high income growth and little change in inequality, the US regains its top spot in all PPP-income and inequality-adjusted measures, and Ethiopia is at the bottom in all measures considered. But important rank reversals continue in-between. Near the bottom, Nepal rises above Bangladesh due to much lower inequality in Nepal.[40] Similarly, Morocco (MAR) far surpasses Botswana (BWA), once inequality is progressively considered and more equal Korea now surpasses much richer but much more unequal Gabon by up to three ranks. Among richer countries, Britain still rises in the ranks when inequality is considered. Unequal Brazil and more equal Costa Rica now trade places.

Table 5 examines the per capita income and well-being in 73 countries in 1990. The differences between the PWT and the World Bank PPP adjustments still exist, but remain consistent in the sense that the differences in assessment in 1990 are largely the same as for

[39] A small part of the problem might be related to the use of the US GDP deflator to turn current PPP GNI into 1996 prices. But when using the PWT's deflators, the results are very similar and the differences observed above remain. They are likely to be due to differences between the 1993 and the 1996 ICP as well as different adjustment and estimation procedures for countries that did not participate in the one or both of the surveys.

[40] The sharp drop in inequality in Nepal is surprising and might partly be due to data quality issues. See also discussion below

1980, although they are generally smaller now, particularly among OECD countries.[41] The inequality-adjusted well-being measures continue to show levels of well-being up to 75% lower than per capita income. Inequality-adjusted well-being is particularly low in some African (such as South Africa (ZAF), Sierra Leone (SLE), Zimbabwe (ZWE), and Kenyia (KEN) as well as Latin American countries (including Brazil, Chile (CHL), Honduras (HDN), Guatemala (GTM), and Mexico (MEX). Sierra Leone has the dubious distinction of having the lowest income shares in its poorest quintile observed anywhere in the data set so that well-being is reduced by 84% if the Atkinson ($\varepsilon = 2$) measure is applied.

Regarding rank reversals, Brazil and South Africa, two of the world's most unequal countries, get surpassed in the Atkinson measure ($\varepsilon = 2$) by Egypt, a country 17 and 22 ranks, respectively, below in the income ranking with less than half the PPP income per capita. That is to say, South Africa could generate the same level of well-being with less than half of its per capita income, if that income was as evenly distributed as it is in Egypt.

Low levels of income and sizeable income inequality assure that many African countries land at the bottom end in all measures. In contrast, China and all South Asian countries rise in ranks, once inequality is considered. At the other end of the spectrum, the US only retains the second spot in the PPP-adjusted income measures and the mildly penalizing inequality-adjusted measures. In the Dagum measure it is surpassed by Canada (CAN) and Luxembourg (LUX) and, in the Atkinson ($\varepsilon = 2$) measure, additionally by Belgium (BEL) and Finland (FIN). This fall in ranks of the US is mostly due to rising inequality there, compared to the other countries (rather than differences in average income growth). Clearly, people in the US are paying a price in terms of well-being due to the higher inequality there and other countries do not suffer from the same problem (see Klasen, 1994).[42] Similarly, higher inequality in Britain ensures that the country no longer rises in ranks once inequality is considered.

Table 6 shows the well-being measures for 77 countries in 1998. At the bottom end, we again find mostly African countries. Indonesia still improves in ranks and is now ahead of Peru in the Dagum and Atkinson ($\varepsilon = 2$) measures. Likewise, poorer but more equal Bulgaria (BGR) and richer but more unequal Mexico trade places in those two measures. The same applies to poorer but more equal Turkey and richer but more unequal Chile. At the top end, Luxembourg continues to top the well-being list in all indicators, but the USA is now back to the second or third rank. This is again due to higher income growth in the US (with little change in inequality), compared to other nations. Rising inequality and poorer growth in Canada leads to a fall in ranks for Canada (compared to 1990) and it now surpassed by some other OECD countries in the Atkinson ($\varepsilon = 2$) and Dagum measures. Also, higher inequality in Britain ensures that Britain for the first time falls in

[41] As a result, growth among richer countries appears higher when using the PWT than when using the WDIs. This is discussed in detail in Grün and Klasen (2003).

[42] Please note that these results differ from Ayala, Martinez, and Ruiz-Huerta (2001) who, based on micro data, find that the US is surpassed only by Belgium in the Atkinson ($\varepsilon = 2$) measure, while Canada and Sweden remain considerably worse off. The difference in findings is probably due to the fact that the present analysis uses the mean (gross) income variable based on national accounts, while in Ayala, Martinez, and Ruiz-Huerta (2001) mean income refers to disposable income based on adjusted micro data. Other sources of differences could be the different PPP adjustments (PWT versus OECD PPP adjustments), and differences in the measured Gini coefficients.

rank, once inequality is concerned. In contrast, Sweden rises considerably in rank, once inequality is considered. In fact, in Sweden has the smallest inequality recorded here and thus the least reduction in well-being in the inequality-adjusted measures. In the Atkinson ($\varepsilon = 2$) measure, well-being is reduced by only 14%, and in the Dagum measure by only 36%.

It is hard to summarize the many particular findings from this discussion and the much more detailed information contained in the tables. But a few points are worth noting. First, as expected, real income comparisons based on official exchange rates give a very misleading impression of well-being. In particular, they systematically understate well-being in developing countries. At the same time, there are also persistent and systematic discrepancies between the two sets of available PPP estimates. Secondly, the consideration of the income distribution has a large impact on well-being. Well-being falls by 15-85 per cent once inequality is taken into account. Third, this has a large impact on static comparisons of well-being in the five benchmark years as discussed in detail above. But fourth, it also changes the impression of relative well-being changes between countries over time. The comparison of welfare levels between Indonesia and Peru in 1980-1998 in Figure 1 is a good example. Relying on per capita income measures, Peru is far ahead of Indonesia in all years. But due to higher growth in Indonesia in the 1980s, the gap is getting smaller. But once inequality is considered as well, Peru's welfare level drops sharply and in 1998 Indonesia has not only closed the gap but, when using the Atkinson ($\varepsilon = 2$) measure or the Dagum measure, reached a slightly higher welfare level than Peru. While it is still far from closing the per capita income gap to Peru, it has already closed the well-being gap due to its much lower inequality.[43] Figure 2 which examines the welfare levels for the US and Canada between 1970 and 1990 is another good illustration of the impact of growth and inequality changes on the relative rankings of countries. While the negatively sloped curves for the US (from per capita income to inequality-adjusted income levels) become steeper when going from 1970 to 1990 thereby indicating rising inequality which leads to lower welfare levels, Canada experiences declining inequality and is thus able, according to the Atkinson ($\varepsilon = 2$) measure and the Dagum measure, to reach a higher welfare level than the US.[44] This is particularly the case when the Atkinson measure is used suggesting that the well-being comparison is driven by particularly large differences in the income share of the poorest quintile. As shown in the Figure, Canada's well-being advantage would be even larger if an Atkinson measure with a greater penalty (the example here is $\varepsilon = 5$) were used.

A third illustrative example is the comparison between Poland and Brazil from 1980 to 1998. In all three years, Poland and Brazil have similar per capita income levels. But due to the much higher inequality in Brazil, well-being is dramatically lower in all three years. This is particularly pronounced in 1990 where the gap in inequality between the two countries is particularly sizable. In 1998, the situation changes a bit. While Brazil had reduced its inequality a bit, it increased considerably in Poland, so that the gap in the inequality adjusted measures is considerably smaller now.

[43]These figures already include the impact of the Asian financial crisis on economic growth in Indonesia which was sharply negative in 1997 and 1998; if Indonesia returns to its previous high growth, it will soon surpass Peru in per capita income, and, if it is able to maintain its relatively low inequality, it will far surpass it in well-being terms.

[44]Interestingly, Canada, despite its smaller income, also regularly surpasses the US in the Human Development Index calculated by the United Nations Development Programme UNDP (2002b).

While Poland is a transition country where both per capita income and inequality increased in the 1990s, there are many more transition countries where per capita income *shrank* and inequality increased.[45] In Figure 4 the well-being implications are powerfully demonstrated.[46] In 1990, Kyrgizstan and Ukraine both had higher per capita incomes and lower inequality than Egypt, thus having much higher levels of (inequality-adjusted) well-being. In 1998, inequality has increased sharply to levels higher than Egypt's, and income growth was negative over the decade, while Egypt experienced moderate income growth and maintained its inequality level. As a result, per capita incomes in Egypt in 1998 is about the same as in Ukraine and substantially higher than in Kyrgizstan. Once inequality is considered, well-being is now significantly higher in Egypt than in Ukraine and the well-being gap to Kyrgizstan is much larger than the income gap. Looking at the income decline in transition countries thus seriously understates the comparative performance of this group of countries. In well-being terms, the 1990s were even more of a catastrophe for many transition countries than suggested by per capita income.

The results from this section clearly demonstrate the large impact our inequality-adjusted measures have on our impression of absolute levels of well-being in countries, the comparative ranking of countries at particular points in time, and the impression of the change in rankings over time. Clearly, considering inequality matters for international assessments of well-being.

6 Sensitivity Analysis

The robustness of the results is checked with the help of two different approaches. First, we simply replace the data on income distribution used in the original analysis by alternative data. Those are either based on different income concepts and/or reference units or come from a different data source.[47] For countries with such alternatives available, we replace the Gini coefficients and income shares, calculate the measures, rank the countries again and compare the results with those obtained from the original analysis.

Table 7 shows the Gini coefficients and their alternatives, what income concepts and recipient units they are based upon as well as the resulting changes in rankings. The simultaneous replacement approach leads mainly to no or only small changes in ranking. In a few cases, more dramatic changes occur although it is unclear to what extent these are due to data errors.[48]

[45] This issue, and its well-being implications, has been discussed in detail by Grün and Klasen (2001).

[46] As the PWT have no income data for many transition countries, this figure is based on the WDI data.

[47] In addition, this replacing approach is restricted to alternative data which are based on the same year (plus/minus one year) as used in the main analysis. The source of alternative data is given in Table 7.

[48] An interesting example is Jamaica in 1960. The alternative Gini coefficient used for Jamaica in 1960 exceeds the one originally used by only 1.7 percentage points, which leads to only little changes in ranking when focussing on the Gini based measures. However, the income shares from the alternative source are very different, leaving the poorest 20 per cent with only half the income and increasing the share of income going to the richest 20 per cent of population considerably. The Atkinson measures responds to these dramatic changes with notably lower ranks. It is quite implausible that a very similar Gini can produce such great differences in income shares, suggesting a data error. We nevertheless used the data

Turning to the year 1980, Canada and Norway experienced significant changes in ranking. For both countries the alternative Gini coefficients were taken from LIS (2000) and are based on the same specifications as the ones used in the original analysis. However, the Gini coefficients itself differ considerably, thereby leading to changes up to 8 ranks. Data on inequality provided by the Luxembourg Income Study are derived from micro data sets and undergo different strategies of top and bottom coding. Both differences may contribute to the existing differences in rank[49].

Mexico in 1990 is another example of the range of inequality data available for one particular point in time. Both Gini coefficients were provided by Deininger and Squire (1996) but belong to different quality classifications. The main difference between the two indices is the income share going to the richest 20 per cent of population, which amounts to 59.3 per cent in the first distribution but is declining to 53.6 per cent in the one used alternatively. Consequently, the distribution of income is more equal according to the alternative data and especially the measures that penalize the existing degree of inequality more rank Mexico up to 6 positions higher. Despite these particular anomalies and differences, the overall impression from Table 7 is one of great stability in the ranks when alternative inequality data are used.

In a second kind of sensitivity analysis, we use a regression-based approach to deal with the inconsistencies in terms of the income concepts and reference units used. The sample is expanded by adding countries not considered in the main analysis but which are part of the reliable set in WIID (2000). This enables us to get several observations per country at the same time which should enhance our ability to identify the reference unit and income definition effects. In particular, we regress the Gini coefficients available on the income definition (expenditure, net income, unknown income, or gross income, the excluded category), and the reference unit considered (household, family, unknown, equivalized, or person, the excluded category). Following suggestions from Atkinson and Brandolini (2001), dummy variables for Deininger-Squire data labelled as 'cs' (no consistent source) and 'ps' (primary source unknown) are also included.

Regression 1 in Table 8 shows that indeed the income definition and the choice of reference unit do matter. Expenditure-based and net-income or equivalized Gini coefficients are typically lower, while household-based Gini coefficients appear to be higher.[50] The interaction term net income and OECD countries in the second regression shows that the difference between gross and net income is largely a phenomenon of OECD countries, as one would expect (Atkinson and Brandolini, 2001).

As a next step, the Gini coefficients are adjusted according to the regression results from the first estimation. All the Gini coefficients are thereby based on the omitted categories, i.e. gross income per person. This way we hope to have dealt with the most

as both the 'original' source (Deininger and Squire, 1996) and WIID classified them as reliable. Clearly, more thorough analysis of the consistency of Gini coefficients and income shares in the two inequality data bases might be necessary.

[49]See Atkinson and Brandolini (2001) for a discussion of related issues

[50]The somewhat surprising result about household-based Gini coefficients was also found by Lundberg and Squire (2001). Note that the regressions here have considerably higher explanatory power (as measured by the R-squared) as the ones used by Dollar and Kraay (2002) and Lundberg and Squire (2001). We do not make a similar adjustment for quintile shares where a similar regression was much more poorly determined. As a result, we are only able to apply this sensitivity analysis to the Gini-based measures.

glaring inconsistencies, although further adjustments are surely possible (Atkinson and Brandolini, 2001).

How do the results change if one uses these adjusted Gini coefficients for the calculation of the Gini based measures? Table 9 shows that generally the results do not change greatly. Using the Sen measure, the vast majority of rankings remain the same or change only by one position. Regarding the Dagum measure, more significant variations happen, but again there is more persistence than change. Only in 1990 are there more significant changes in rank. Moreover, all of the dramatic rank reversals and changes discussed earlier still hold.

These sensitivity analyses suggest that few of the basic results on the large absolute impact of income inequality and the change in ranks as a result of it are seriously affected by using different data sets or addressing the inconsistencies in the underlying income concept and reference unit. However, quite a number of individual rankings are affected so that analyses focussing on smaller differences, particularly among OECD countries, should be based upon more consistent data sources rather than rely on the somewhat heterogeneous information used here (e.g. Ayala, Martinez, and Ruiz-Huerta, 2001).

7 Concluding Remarks

Most theories of well-being as well as an overwhelming array of experimental and empirical literature document the well-being penalty imposed by inequality. Nevertheless, this insight is rarely used to adjust international and intertemporal comparisons of well-being. In this paper we combine the insights from this literature with newly available internationally (roughly) comparable data of per capita income and its distribution to demonstrate the impact of considering inequality in an assessment of well-being. The impression of well-being derived from inequality-adjusted measures drastically differs from the one obtained when looking at the mean income alone.

In particular, due to sizable inequality existing in most countries, our measures show dramatically reduced levels of well-being, compared to per capita income. Due to great differences in inequality between countries, incroporating inequality has a sizable impact on the ranking of countries in terms of their average well-being. Countries like Brazil, Mexico, Chile, but also the USA have considerably lower levels of well-being than suggested by per capita income. In contrast, countries such as Indonesia, Bangladesh, Finland, Sweden and Belgium are examples of reaching a higher well-being rank than their pure income rank. Moreover, different trends in inequality affect the ranking of countries over time. In particular, the progressive worsening of Britain in the inequality-adjusted ranks is not just due to a falling behind in per capita incomes, but also due to worsening inequality, compared to other industrialized countries. More dramatically, inequality-adjusted well-being in many transition countries in the 1990s has collapsed to levels of lower middle-income countries and sometimes even low-income countries due to the combination of drastically falling inequality and greatly increased inequality.

Our sensitivity analysis suggests that the results are quite robust to using different data sources and to dealing with some of the known inconsistencies in the inequality data. Nevertheless, there remains much room for improvement in generating more consistent, comparable, and timely inequality data that will allow more accurate and robust assessments of well-being across space and time.

Table 1: **Income and Inequality Data, 1960-1998**

Country	Code	1960	1970	1980	1990	1998
Algeria	DZA	-	-	-	1988 (38.7)	1995 (35.3)
Australia	AUS	-	1969 (32.0)	1981 (40.0)	1990 (41.7)	1994 (31.1)[b]
Bahamas	BHS	-	-	-	-	1993 (45.3)
Bangladesh	BGD	1963 (37.3)	1973 (36.0)	1981 (39.0)	1989 (28.9)	1996 (33.6)
Barbados	BRB	-	-	1979 (48.9)	-	-
Belgium	BEL	-	1979 (28.3)	1985 (26.2)	1988 (26.6)	1997 (25.0)[b]
Benin	BEN	1959 (42.0)	-	-	-	-
Bolivia	BOL	-	1968 (53.0)	-	1990 (42.0)	-
Botswana	BWA	-	-	1986 (54.2)	-	-
Brazil	BRA	1960 (53.0)	1970 (57.6)	1980 (57.8)	1989 (59.6)	1997 (51.7)[a]
Bulgaria	BGR	-	-	-	1990 (24.5)	1997 (27.3)
Burkina Faso	BFA	-	-	-	-	1994 (48.2)
Burundi	BDI	-	-	-	-	1992 (33.3)
Cambodia	KHM	-	-	-	-	1997 (40.4)[a]
Canada	CAN	1965 (31.6)	1971 (32.2)	1981 (31.8)	1990 (27.6)	1998 (30.5)[b]
Central African Republic	CAF	-	-	-	-	1993 (61.3)
Chad	TCD	1958 (35.0)	-	-	-	-
Chile	CHL	1968 (45.6)	1971 (46.0)	-	1990 (56.1)[a]	1994 (54.8)[a]
China	CHN	-	-	1980 (32.0)	1990 (34.6)	1997 (39.8)[a]
Colombia	COL	1964 (62.0)	1970 (52.0)	1978 (54.5)	1991 (51.3)	-
Costa Rica	CRI	1961 (50.0)	1971 (44.4)	1981 (47.5)	1989 (46.1)	-
Cote d'Ivoire	CIV	1959 (43.0)	-	1985 (41.2)	1988 (36.9)	1995 (36.7)
Denmark	DNK	1963 (37.0)	1976 (31.0)	1981 (31.0)	1987 (33.1)	1995 (37.4)
Dominican Republic	DOM	-	-	1984 (43.3)	1989 (50.5)	-
Ecuador	ECU	-	1968 (38.0)	-	1988 (43.9)[a]	1995 (43.7)
Egypt	EGY	-	-	-	1991 (32.0)	1995 (28.9)
El Salvador	SLV	1965 (53.0)	-	1977 (48.4)	-	-
Ethiopia	ETH	-	-	1981 (32.4)[a]	-	1995 (40.0)
Fiji	FJI	-	1968 (46.0)	-	-	-
Finland	FIN	1966 (31.8)	1977 (30.5)	1980 (30.9)	1987 (26.1)	1997 (23.6)
France	FRA	1962 (50.0)	1970 (39.8)	1979 (34.9)	-	1994 (28.8)[b]
Gabon	GAB	1960 (64.0)	1975 (59.3)	1977 (63.2)	-	-
The Gambia	GMB	-	-	-	-	1992 (47.8)
Ghana	GHA	-	-	-	1989 (36.7)	1997 (32.7)

continued on next page

Table 1: *continued*

Country	**Code**	**1960**	**1970**	**1980**	**1990**	**1998**
Greece	GRC	1957 (38.0)	1974 (35.1)	1981 (33.3)	1988 (35.2)	-
Guatemala	GTM	-	-	1979 (49.7)	1989 (59.1)	-
Guinea	GIN	-	-	-	1991 (46.8)	1994 (40.3)
Guinea-Bissau	GNB	-	-	-	-	1991 (56.2)
Guyana	GUY	1956 (56.2)	-	-	-	1993 (40.2)
Honduras	HND	-	1968 (61.9)	-	1990 (57.4)[a]	1992 (52.6)
Hong Kong	HKG	-	1971 (40.9)	1980 (37.3)	1986 (42.0)	1991 (45.0)
Hungary	HUN	-	1972 (22.8)	1982 (21.0)	1991 (23.3)	1998 (25.3)
India	IND	1960 (32.6)	1970 (30.4)	1983 (31.5)	1990 (29.7)	1997 (37.8)
Indonesia	IDN	-	1976 (34.6)	1980 (35.6)	1990 (33.1)	1995 (34.2)
Ireland	IRL	-	1973 (38.7)	1980 (35.7)	1987 (34.6)	-
Italy	ITA	-	1977 (36.3)	1980 (34.3)	1989 (32.7)	1995 (34.2)[b]
Jamaica	JAM	1958 (54.3)	1975 (44.5)	1988 (43.2)	1990 (41.8)	1996 (36.4)
Japan	JPN	1962 (37.2)	1970 (35.5)	1980 (33.4)	-	-
Jordan	JOR	-	-	1980 (40.8)	1991 (40.7)	1997 (36.4)
Kenya	KEN	-	-	-	1992 (54.4)	1994 (44.5)
Republic of Korea	KOR	1965 (34.3)	1970 (33.3)	1980 (38.6)	1988 (33.6)	1993 (31.6)
Laos	LAO	-	-	-	-	1992 (30.4)
Lesotho	LSO	-	-	-	1987 (56.0)	1993 (57.9)[a]
Luxembourg	LUX	-	-	-	1985 (27.1)	1994 (23.5)[b]
Madagascar	MDG	1960 (53.0)	-	1980 (46.9)[a]	-	1993 (43.4)
Malaysia	MYS	-	1970 (50.0)	1979 (51.0)	1989 (48.4)	-
Mali	MLI	-	-	-	1989 (36.5)[a]	1994 (50.5)
Mauritania	MRT	-	-	-	1988 (42.5)	1995 (38.9)
Mauritius	MUS	-	-	1980 (45.7)	1986 (39.6)	1991 (36.7)
Mexico	MEX	1963 (53.0)	1968 (57.7)	1984 (50.6)	1989 (55.0)	1992 (50.3)
Mongolia	MNG	-	-	-	-	1995 (33.2)
Morocco	MAR	-	-	1984 (39.2)	1991 (39.2)	1999 (39.5)
Mozambique	MOZ	-	-	-	-	1997 (39.6)[a]
Namibia	NAM	-	-	-	-	1993 (74.3)[a]
Nepal	NPL	-	1977 (53.0)	1984 (30.1)	-	1996 (36.7)
Netherlands	NLD	1962 (42.0)	1975 (28.6)	1981 (26.7)	1991 (29.4)	1994 (25.3)[b]
New Zealand	NZL	-	1973 (30.1)	1980 (34.8)	1989 (36.6)	1990 (40.2)
Nicaragua	NIC	-	-	-	-	1993 (50.3)

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Table 1: *continued*

Country	**Code**	**1960**	**1970**	**1980**	**1990**	**1998**
Niger	NER	1960 (34.0)	-	-	1992 (36.1)	1995 (50.6)
Nigeria	NGA	1959 (51.0)	-	1986 (37.0)	1992 (41.2)	1997 (50.6)
Norway	NOR	1962 (37.5)	1973 (37.5)	1979 (31.2)	1990 (33.3)	1995 (23.8)[b]
Pakistan	PAK	1969 (30.6)	1970 (29.9)	1979 (32.3)	1988 (31.4)	1997 (31.2)
Panama	PAN	1969 (48.0)	1970 (57.0)	1980 (47.5)	1989 (56.5)	1997 (48.5)
Papua New Guinea	PNG	-	-	-	-	1997 (50.9)
Paraguay	PRY	-	-	-	1991 (39.7)[a]	-
Peru	PER	1961 (61.0)	-	1981 (49.3)	1986 (42.8)	1997 (46.2)[a]
Philippines	PHL	1961 (49.7)	1971 (49.4)	1985 (46.1)	1988 (44.7)	1997 (46.2)
Poland	POL	-	-	1980 (24.9)	1990 (26.2)	1996 (33.7)
Portugal	PRT	-	1973 (40.6)	1980 (36.8)	1990 (36.8)	1991 (35.6)
Romania	ROM	-	-	-	1989 (23.4)	1994 (28.7)
Rwanda	RWA	-	-	1983 (28.9)	-	-
Senegal	SEN	1960 (56.0)	-	-	1991 (53.8)	1994 (41.3)
Sierra Leone	SLE	-	1968 (60.8)	-	1989 (62.9)	-
Singapore	SGP	-	1978 (37.0)	1980 (40.7)	1988 (41.0)	-
South Africa	ZAF	-	-	-	1993 (62.3)	1994 (59.3)
Spain	ESP	1965 (32.0)	1973 (37.1)	1980 (34.2)	1990 (30.3)[b]	1991 (33.0)
Sri Lanka	LKA	1963 (47.0)	1970 (37.7)	1980 (42.0)	1990 (30.1)	1995 (34.4)
Sweden	SWE	1967 (37.9)	1975 (31.4)	1980 (29.4)	1990 (29.0)	1995 (22.1)[b]
Tanzania	TZA	1964 (54.0)	-	-	1991 (59.0)	1993 (38.1)
Thailand	THA	1962 (41.3)	1969 (42.6)	1981 (43.1)	1990 (48.8)	1998 (41.4)
Trinidad and Tobago	TTO	1958 (46.0)	1971 (51.0)	1981 (41.7)	-	-
Tunisia	TUN	1965 (42.3)	1971 (53.0)	1985 (43.4)[a]	1990 (40.2)	-
Turkey	TUR	1968 (56.0)	1973 (51.0)	-	1987 (44.1)	1994 (41.5)
Uganda	UGA	-	-	-	1989 (33.0)	1993 (39.2)
United Kingdom	GBR	1961 (25.3)	1970 (25.1)	1980 (24.9)	1990 (32.3)	1999 (34.5)[b]
USA	USA	1960 (34.9)	1970 (34.1)	1980 (35.2)	1990 (37.8)	1997 (37.2)[b]
Venezuela	VEN	1962 (42.0)	1971 (47.7)	1981 (42.8)	1989 (44.1)	-
Vietnam	VNM	-	-	-	1992 (35.7)[a]	1998 (36.1)[a]
Yemen	YEM	-	-	-	1992 (39.5)[a]	1998 (21.8)[a]
Zambia	ZMB	1959 (48.0)	-	1976 (51.0)	1991 (48.3)[a]	1996 (49.8)
Zimbabwe	ZWE	-	-	-	1990 (56.8)	-

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Table 1: *continued*

Country	Code	1960	1970	1980	1990	1998

Notes: Gini coefficients are in parentheses. If not otherwise indicated, data are taken from WIID (2000).
[a]: Data taken from the World Bank (World Bank, 2002a).
[b]: Data are kindly provided by David Jesuit and Tim Smeeding (LIS).

Table 2: **Welfare Measures 1960**

Rank	GNP/cap* (exchange rate)		GNP/cap** (PPP)		Atkinson ($\epsilon = 1$) (% of GNP/cap, PPP)		Sen (% of GNP/cap, PPP)		Atkinson ($\epsilon = 2$) (% of GNP/cap, PPP)		Dagum (% of GNP/cap, PPP)	
43	TZA	n.a.	TZA	368	TZA	65.5	TZA	46.0	TZA	49.1	TZA	29.9
42	IND	163	PAK	629	PAK	87.8	PAK	69.4	PAK	78.3	NGA	32.5
41	PAK	187	IND	742	IND	86.0	IND	67.4	NGA	52.6	PAK	53.1
40	NGA	217	NGA	1027	NGA	67.0	NGA	49.0	MDG	45.8	MDG	30.7
39	BGD	222	BGD	1060	ZMB	71.8	ZMB	52.0	IND	75.3	IND	50.8
38	LKA	271	BEN	1063	MDG	64.8	MDG	47.0	ZMB	57.7	ZMB	35.1
37	TCD	292	ZMB	1081	DHM	78.6	DHM	58.0	SEN	38.2	DHM	40.8
36	BEN	357	THA	1088	THA	77.4	THA	58.7	THA	64.0	THA	41.5
35	MDG	374	MDG	1199	BGD	81.6	BGD	62.7	LKA	52.7	LKA	36.1
34	NER	413	TCD	1204	LKA	71.5	LKA	53.0	DHM	66.1	BGD	45.7
33	THA	459	LKA	1323	TCD	84.2	GUY	43.8	BGD	67.9	GUY	28.1
32	CIV	601	KOR	1495	SEN	58.3	TCD	65.0	COL	29.2	SEN	28.2
31	GUY	620	NER	1629	KOR	82.0	SEN	44.0	GAB	27.9	TCD	48.1
30	ZMB	627	CIV	1659	CIV	75.6	CIV	57.0	TCD	72.5	COL	23.5
29	SEN[d]	650	GUY	1743	COL	50.2	COL	38.0	GUY	54.6	GAB	22.0
28	PHL	715	SEN	1790	GUY	74.8	KOR	65.7	BRA	40.4	CIV	39.9
27	TUN[a]	791	PHL	1986	PHL	67.2	PHL	50.3	PHL	48.4	PHL	33.6
26	COL[b]	1239	TUN	1989	NER	84.3	GAB	36.0	KOR	66.2	BRA	30.7
25	SLV	1328	BRA	2371	GAB	48.2	NER	66.0	TUR	38.9	KOR	48.9
24	KOR	1347	PAN	2481	BRA	61.2	BRA	47.0	CIV	63.6	PER	24.2
23	JAM	1395	COL	2516	TUN	76.7	TUN	57.7	PER	36.6	TUR	28.2
22	TTO	1466	JAM	2684	TUR	60.2	TUR	44.0	NER	72.3	JAM	29.6
21	PAN	1590	TUR	2694	PER	54.1	PER	39.0	TUN	60.7	NER	49.3
20	MEX	1621	GAB	2884	PAN	70.3	JAM	45.7	PAN	53.6	TUN	40.5
19	TUR[d]	1637	PER	3122	JAM	73.9	PAN	52.0	JAM	54.2	PAN	35.1

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Table 2: *continued*

Rank	GNP/cap* (exchange rate)		GNP/cap** (PPP)		Atkinson ($\epsilon = 1$) (% of GNP/cap, PPP)		Sen (% of GNP/cap, PPP)		Atkinson ($\epsilon = 2$) (% of GNP/cap, PPP)		Dagum (% of GNP/cap, PPP)	
18	PER	1857	SLV	3289	SLV	64.0	SLV	47.0	SLV	47.9	SLV	30.7
17	BRA	1887	CRI	3443	MEX	62.1	CRI	50.0	MEX	42.0	CRI	33.3
16	GAB	1911	CHL	3631	CRI	69.9	MEX	47.0	TTO	46.8	MEX	30.7
15	CRI	2010	MEX	3866	CHL	71.8	CHL	54.4	CRI	54.1	CHL	37.4
14	CHL	2209	TTO	3946	TTO	69.9	TTO	54.0	CHL	52.9	TTO	37.0
13	GRC	3537	GRC	4267	GRC	80.7	GRC	62.0	FRA	31.6	GRC	44.9
12	VEN[c]	3896	JPN	4543	JPN	79.9	JPN	62.8	JPN	63.9	JPN	45.8
11	ESP	4740	ESP	4663	ESP	88.2	ESP	68.0	GRC	69.5	ESP	51.5
10	JPN	8372	VEN	7369	FRA	59.9	FRA	50.0	ESP	76.1	FRA	33.3
9	GBR	9752	FIN	7488	VEN	73.6	VEN	58.0	VEN	53.7	VEN	40.8
8	FIN	10087	FRA	7848	FIN	86.1	NOR	62.5	NLD	52.1	NOR	45.5
7	FRA	10857	NOR	8140	NOR	82.5	FIN	68.2	SWE	50.0	NLD	40.8
6	NOR	11363	NLD	9381	NLD	73.1	NLD	58.0	NOR	64.0	FIN	51.7
5	CAN	11795	GBR	9744	SWE	75.2	SWE	62.1	FIN	74.5	SWE	45.0
4	NLD	12416	CAN	10204	GBR	89.4	DNK	63.0	DNK	60.8	DNK	46.0
3	USA	13579	SWE	10215	DNK	79.4	CAN	68.4	USA	60.6	CAN	52.0
2	SWE	13600	DNK	10999	CAN	85.7	GBR	74.7	CAN	72.8	GBR	59.6
1	DNK	15458	USA	12223	USA	79.7	USA	65.1	GBR	80.4	USA	48.3

Notes: All rankings are based on the absolute values of the well-being indicator.
The last four columns present the ratios of the respective inequality-adjusted income to GNP per capita, PPP, shown in the third column.
*: GNP per capita, constant 1996 US-Dollars (WDI, 1999, 2001).
**: Real GNP per capita, 1996 prices (Summers and Heston, 1991; Heston, Summers, and Aten, 2001).
[a]: Income data of Tunisia (TUN) from 1961.
[b]: Income data of Colombia (COL) from 1965.
[c]: Income data of Venezuela (VEN) from 1967.
[d]: Income data of Senegal (SEN) and Turkey (TUR) from 1968.
n.a.: Income data not available.

Table 3: **Welfare Measures 1970**

Rank	GNP/cap (exchange rate)		GNP/cap (PPP)		Atkinson ($\epsilon = 1$) (% of GNP/cap, PPP)		Sen (% of GNP/cap, PPP)		Atkinson ($\epsilon = 2$) (% of GNP/cap, PPP)		Dagum (% of GNP/cap, PPP)	
48	NPL	160	NPL	816	NPL	66.6	NPL	47.0	NPL	49.5	NPL	30.7
47	IND	215	PAK	934	SLE	50.5	SLE	39.2	SLE	27.6	SLE	24.4
46	BGD	261	IND	1067	PAK	88.2	PAK	70.1	HND	24.8	HND	23.5
45	SLE	281	IDN	1092	HND	48.9	HND	38.1	PAK	78.9	PAK	54.0
44	PAK	285	BGD	1107	BGD	82.1	BGD	64.0	BGD	68.6	BGD	47.1
43	IDN	306	SLE	1464	IDN	84.5	IDN	65.4	IDN	72.9	IDN	48.6
42	LKA	332	LKA	1532	IND	87.7	IND	69.6	IND	77.9	IND	53.4
41	HND	577	HND	1803	LKA	81.3	LKA	62.3	LKA	67.6	LKA	45.2
40	THA	776	THA	1825	THA	75.0	THA	57.4	THA	57.8	THA	40.2
39	BOL	845	ECU	2248	TUN	60.8	TUN	47.0	PAN	27.7	TUN	30.7
38	PHL	846	PHL	2353	PHL	67.2	PHL	50.6	PHL	46.1	PHL	33.9
37	ECU	906	TUN	2463	BOL	63.0	BOL	47.0	TUN	44.6	BOL	30.7
36	TUN	980	BOL	2608	ECU	80.1	ECU	62.0	BOL	43.5	MYS	33.3
35	MYS	1384	KOR	2714	MYS	66.7	MYS	50.0	MYS	47.2	BRA	26.9
34	COL	1415	MYS	2810	PAN	52.9	COL	48.0	BRA	38.9	COL	31.6
33	FJI	1685	COL	3070	BRA	59.1	BRA	42.4	ECU	64.9	ECU	44.9
32	TUR	1703	FJI	3286	COL	68.9	PAN	43.0	FJI	48.6	PAN	27.4
31	JAM	1911	BRA	3569	FJI	68.9	FJI	54.0	TUR	44.7	TUR	32.5
30	TTO	2029	TUR	3658	KOR	84.4	TUR	49.0	COL	55.2	FJI	37.0
29	KOR	2214	JAM	3698	TUR	65.5	KOR	66.7	TTO	28.5	KOR	50.0
28	MEX	2309	PAN	3889	JAM	71.3	JAM	55.5	JAM	51.0	JAM	38.4
27	CRI	2417	CRI	4114	MEX	55.7	CRI	55.6	MEX	34.7	MEX	26.8
26	PAN	2437	CHL	4544	CRI	74.4	MEX	42.3	KOR	71.9	CRI	38.5
25	BRA	2600	HUN	5288	CHL	70.7	CHL	54.0	CHL	51.4	GAB	25.6
24	CHL	2670	SGP	5330	TTO	55.8	GAB	40.7	CRI	57.7	CHL	37.0
23	HUN	2703	MEX	5452	GAB	59.2	TTO	49.0	GAB	40.6	TTO	32.5
22	GAB	3446	TTO	6060	SGP	83.4	SGP	63.0	SGP	70.3	SGP	46.0
21	VEN	4196	PRT	6314	HUN	92.1	PRT	59.4	HKG	59.7	PRT	42.3
20	PRT	5166	GAB	6505	HKG	75.4	HKG	59.1	PRT	62.2	HKG	41.9
19	SGP	5589	HKG	6506	PRT	78.3	HUN	77.2	HUN	84.7	HUN	62.9
18	HKG	6065	IRL	7666	IRL	78.7	IRL	61.3	IRL	59.6	IRL	44.2
17	GRC	6984	GRC	8644	VEN	69.5	VEN	52.4	VEN	47.9	VEN	35.5

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Table 3: *continued*

Rank	GNP/cap (exchange rate)		GNP/cap (PPP)		Atkinson ($\epsilon = 1$) (% of GNP/cap, PPP)		Sen (% of GNP/cap, PPP)		Atkinson ($\epsilon = 2$) (% of GNP/cap, PPP)		Dagum (% of GNP/cap, PPP)	
16	IRL	8483	ESP	9074	GRC	82.6	GRC	64.9	GRC	68.0	GRC	48.0
15	ESP	8677	VEN	10087	ESP	82.4	ESP	62.9	FRA	48.7	ESP	45.9
14	ITA	11064	NOR	11071	NOR	77.2	NOR	62.5	ESP	67.0	NOR	45.5
13	GBR	12151	FIN	11320	JPN	75.5	ITA	63.7	JPN	56.2	ITA	46.7
12	CAN	12522	ITA	11356	FRA	71.2	JPN	64.5	NOR	58.7	FRA	43.1
11	NZL	12648	JPN	11454	ITA	83.7	FRA	60.2	ITA	70.5	JPN	47.6
10	AUS	13698	GBR	12172	FIN	85.3	FIN	69.6	FIN	71.7	FIN	53.3
9	FIN	15389	BEL	12302	BEL	88.3	BEL	71.8	BEL	77.3	BEL	55.9
8	NOR	15840	FRA	12360	GBR	90.0	GBR	74.9	CAN	70.6	CAN	51.2
7	BEL	16714	NLD	13488	NZL	86.2	CAN	67.8	NZL	72.8	GBR	59.9
6	FRA	16774	NZL	13570	CAN	84.7	NZL	70.0	GBR	81.8	NZL	53.8
5	USA	17443	CAN	13888	NLD	88.5	NLD	71.4	SWE	69.0	NLD	55.5
4	NLD	17890	AUS	14691	SWE	84.5	AUS	68.0	USA	64.6	AUS	51.5
3	SWE	19874	SWE	14873	AUS	85.5	SWE	68.6	NLD	78.4	SWE	52.2
2	JPN	20370	DNK	16053	USA	81.5	USA	65.9	AUS	72.6	USA	49.2
1	DNK	22190	USA	16290	DNK	85.4	DNK	69.0	DNK	72.2	DNK	52.7

Notes: For definition of columns, see Table 2 .

Table 4: **Welfare Measures 1980**

Rank	GNP/cap (exchange rate)		GNI/cap* (PPP)		GNP/cap (PPP)		Atkinson ($\epsilon = 1$) (% of GNP/cap, PPP)		Sen (% of GNP/cap, PPP)		Atkinson ($\epsilon = 2$) (% of GNP/cap, PPP)		Dagum (% of GNP/cap, PPP)	
58	ETH[a]	119	COL	n.a.	ETH	641	ETH	86.5	ETH	67.6	ETH	76.1	ETH	51.0
57	NPL	154	POL	n.a.	NPL	865	ZMB	65.4	ZMB	49.0	ZMB	45.2	ZMB	32.5
56	CHN	170	ETH[a]	721	BGD	974	NPL	88.0	MDG	53.2	MDG	54.5	MDG	36.2
55	BGD	227	CHN	809	CHN	1069	MDG	72.1	BGD	61.0	BGD	66.3	BGD	43.9
54	IND	234	NPL	862	MDG	1082	BGD	80.5	NPL	69.9	NPL	78.5	NPL	53.8
53	NGA	253	BGD	985	RWA	1099	CHN	87.3	CHN	68.0	NGA	69.6	NGA	46.0
52	PAK	325	NGA	1020	PAK	1138	NGA	82.7	NGA	63.0	CHN	75.8	CHN	51.5
51	RWA	328	ZMB	1143	ZMB	1147	RWA	88.9	PAK	67.7	PAK	76.0	PAK	51.1
50	MDG	345	IND	1178	NGA	1156	PAK	86.4	RWA	71.1	RWA	80.3	IND	52.1

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Table 4: *continued*

Rank	GNP/cap (exchange rate)		GNI/cap* (PPP)		GNP/cap (PPP)		Atkinson ($\epsilon = 1$) (% of GNP/cap, PPP)		Sen (% of GNP/cap, PPP)		Atkinson ($\epsilon = 2$) (% of GNP/cap, PPP)		Dagum (% of GNP/cap, PPP)	
49	LKA	439	MDG	1178	IND	1161	IND	86.9	IND	68.5	IND	76.6	RWA	55.2
48	IDN	493	PAK	1178	LKA	1778	IDN	84.0	LKA	58.0	IDN	71.4	LKA	40.8
47	ZMB	553	RWA	1266	IDN	1818	LKA	89.1	IDN	64.4	LKA	78.6	IDN	47.5
46	CIV	1004	IDN	1460	CIV	2404	CIV	77.4	CIV	58.8	THA	52.4	BWA	29.7
45	MAR	1111	LKA	1864	THA	2708	THA	71.8	BWA	45.8	BWA	43.1	CIV	41.6
44	THA	1135	CIV	2163	DOM	2824	BWA	63.1	THA	56.9	CIV	61.1	THA	39.8
43	PHL	1187	THA	2568	MAR	2928	DOM	75.7	DOM	56.7	DOM	58.6	DOM	39.6
42	DOM	1309	MAR	2867	JAM	3157	MAR	80.4	PHL	53.9	COL	40.7	PHL	36.9
41	JAM	1482	JAM	3078	PHL	3282	JAM	75.8	MAR	60.8	PHL	56.1	JAM	39.7
40	BWA	1515	BWA	3113	BWA	3334	PHL	73.0	JAM	56.8	JAM	59.0	COL	29.4
39	SLV	1589	DOM	3763	GTM	4034	COL	62.2	COL	45.5	MAR	66.3	MAR	43.7
38	TUN	1613	GTM	3957	SLV	4061	GTM	69.6	GTM	50.3	GTM	51.5	GTM	33.6
37	GTM	1620	MYS	4080	JOR	4100	SLV	69.9	SLV	51.6	SLV	52.0	SLV	34.8
36	MUS	1802	SLV	4115	TUN	4217	JOR	74.7	MYS	49.0	MYS	46.2	MYS	32.5
35	JOR	1880	MUS	4133	COL	4284	MYS	66.6	PER	50.7	BRA	36.8	PER	33.9
34	COL	1957	TUN	4133	PER	4673	PER	67.8	TUN	56.6	CRI	44.9	BRA	26.8
33	MYS	2312	PHL	4326	MYS	4704	TUN	75.6	JOR	59.2	PAN	50.0	TUN	39.4
32	PAN	2459	JOR	4537	KOR	4750	PAN	69.7	PAN	52.5	JOR	58.8	PAN	35.6
31	PER	2490	PAN	4801	PAN	4760	CRI	67.8	BRA	42.2	PER	52.4	JOR	42.0
30	POL	2967	PER	5170	CRI	5176	BRA	58.0	CRI	52.5	TUN	59.2	GAB	22.6
29	CRI	3044	KOR	5293	MUS	5642	KOR	77.8	KOR	61.4	GAB	33.7	CRI	35.6
28	MEX	3245	GAB	6454	BRA	6170	GAB	53.6	GAB	36.8	KOR	60.0	MUS	37.3
27	KOR	3760	CRI	6472	POL	6632	MUS	82.9	MUS	54.3	BRB	35.8	KOR	44.3
26	VEN	4075	BRA	6876	MEX	7434	MEX	67.2	MEX	49.4	MEX	47.9	MEX	32.8
25	HUN	4210	VEN	7105	VEN	8004	VEN	75.2	VEN	57.2	MUS	68.4	VEN	40.0
24	BRA	4512	TTO	7562	HUN	8052	POL	91.4	POL	75.1	TTO	48.6	BRB	34.4
23	GAB	5057	MEX	7738	GAB	8162	BRB	63.3	BRB	51.1	VEN	57.3	TTO	41.1
22	TTO	5065	HUN	9497	PRT	8796	TTO	72.4	TTO	58.3	POL	83.6	POL	60.2
21	BRB	6909	SGP	9971	TTO	9115	PRT	80.4	PRT	63.2	PRT	63.6	PRT	46.2
20	PRT	7343	PRT	10024	BRB	9928	HUN	93.9	HUN	79.0	IRL	59.1	SGP	42.2
19	GRC	10122	IRL	10253	IRL	9944	IRL	77.8	IRL	64.4	SGP	64.7	IRL	47.4
18	SGP	10886	ESP	12152	SGP	10987	SGP	79.1	SGP	59.3	HUN	88.4	HUN	65.3

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Table 4: *continued*

Rank	GNP/cap (exchange rate)		GNI/cap* (PPP)		GNP/cap (PPP)		Atkinson ($\epsilon = 1$) (% of GNP/cap, PPP)		Sen (% of GNP/cap, PPP)		Atkinson ($\epsilon = 2$) (% of GNP/cap, PPP)		Dagum (% of GNP/cap, PPP)	
17	IRL	11068	HKG	12205	ESP	11476	ESP	83.5	ESP	65.8	ESP	69.4	ESP	49.0
16	ESP	11174	BRB	12539	GRC	12265	HKG	79.4	HKG	62.7	HKG	64.5	HKG	45.7
15	HKG	11515	GRC	14087	HKG	12578	GRC	84.1	GRC	66.7	GRC	70.4	GRC	50.0
14	NZL	13966	NZL	14966	NZL	13921	NZL	82.4	NZL	65.2	NZL	66.8	NZL	48.4
13	GBR	14503	GBR	15757	GBR	14143	GBR	89.9	ITA	65.7	AUS	56.5	AUS	42.9
12	ITA	14990	FIN	16179	ITA	15282	NOR	78.5	AUS	60.0	NOR	58.7	ITA	48.9
11	AUS	16001	ITA	16777	FIN	15316	AUS	76.2	JPN	66.6	JPN	68.7	JPN	49.9
10	CAN	16280	AUS	17111	JPN	15620	FIN	84.5	FIN	69.1	FIN	70.6	FRA	48.3
9	FIN	20710	JPN	17481	BEL	16288	JPN	83.5	GBR	75.1	FRA	69.8	FIN	52.8
8	USA	21593	SWE	17797	NOR	16301	ITA	86.7	FRA	65.1	ITA	75.3	GBR	60.1
7	NLD	21868	FRA	17956	FRA	16309	FRA	83.5	NOR	68.9	GBR	81.9	NOR	52.5
6	FRA	21968	NLD	18184	NLD	16327	BEL	90.0	NLD	73.3	SWE	73.7	SWE	54.6
5	BEL	22243	NOR	18852	AUS	16811	NLD	90.1	BEL	73.8	DNK	71.6	DNK	52.7
4	SWE	23218	BEL	19380	SWE	17121	SWE	86.8	SWE	70.6	BEL	80.5	NLD	57.9
3	NOR	23228	DNK	19767	DNK	17920	DNK	85.4	DNK	69.0	CAN	71.6	BEL	58.5
2	DNK	26249	CAN	20224	CAN	18481	CAN	85.6	CAN	68.2	NLD	81.1	CAN	51.7
1	JPN	28217	USA	22897	USA	21346	USA	80.1	USA	64.8	USA	62.2	USA	47.9

*Notes:*The inequality-adjustment in the last four columns is based on GNP/cap, PPP shown in the fourth column. For other definitions, see Table 2

*: Real GNI per capita, 1996 prices (WDI, 2002).

[a]: Income data of Ethiopia (ETH) from 1981.

Table 5: **Welfare Measures 1990**

Rank	GNP/cap (exchange rate)		GNI/cap (PPP)		GNP/cap (PPP)		Atkinson ($\epsilon = 1$) (% of GNP/cap, PPP)		Sen (% of GNP/cap, PPP)		Atkinson ($\epsilon = 2$) (% of GNP/cap, PPP)		Dagum (% of GNP/cap, PPP)	
73	TZA	185	COL	n.a.	TZA	472	TZA	55.7	TZA	41.0	TZA	33.3	TZA	25.8
72	VNM	206	TZA	498	UGA	674	SLE	39.9	SLE	37.1	SLE	15.9	SLE	22.8
71	NGA	224	YEM	649	MLI	750	UGA	85.7	UGA	67.0	ZMB	44.3	ZMB	34.9
70	NER	234	MLI	672	NER	926	MLI	82.3	MLI	63.5	UGA	75.1	UGA	50.4
69	SLE	246	NGA	800	ZMB	934	ZMB	66.6	ZMB	51.7	MLI	69.0	MLI	46.5
68	UGA	251	NER	835	NGA	984	KEN	60.6	KEN	45.6	KEN	40.9	KEN	29.5

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Table 5: *continued*

Rank	GNP/cap (exchange rate)		GNI/cap (PPP)		GNP/cap (PPP)		Atkinson ($\epsilon = 1$) (% of GNP/cap, PPP)		Sen (% of GNP/cap, PPP)		Atkinson ($\epsilon = 2$) (% of GNP/cap, PPP)		Dagum (% of GNP/cap, PPP)	
67	MLI	256	UGA	846	YEM	1092	NER	83.2	NGA	58.9	SEN	41.1	NGA	41.7
66	BGD	289	ZMB	893	SLE	1106	NGA	78.7	NER	63.9	NGA	64.4	NER	47.0
65	YEM	306	SLE	893	GHA	1159	YEM	79.5	YEM	60.6	NER	70.8	SEN	30.0
64	IND	327	KEN	1078	VNM	1192	SEN	62.8	SEN	46.2	MRT	49.7	YEM	43.4
63	KEN	345	VNM	1124	KEN	1267	GHA	82.2	GHA	63.3	YEM	64.3	GHA	46.3
62	GHA	352	BGD	1159	BGD	1273	VNM	83.4	VNM	64.3	HND	37.0	MRT	40.3
61	CHN	358	SEN	1345	MRT	1367	MRT	72.9	MRT	57.5	GHA	68.7	HND	27.1
60	MRT	420	MRT	1426	SEN	1453	BGD	89.0	HND	42.6	VNM	71.4	VNM	47.4
59	PAK	454	CIV	1530	IND	1655	HND	58.6	BGD	71.2	LSO	37.8	LSO	28.2
58	ZMB	514	GHA	1553	PAK	1705	LSO	59.6	LSO	44.0	GIN	42.8	BGD	55.2
57	GIN	517	PAK	1576	CHN	1791	IND	88.3	CIV	63.1	BGD	80.3	ZWE	27.5
56	SEN	557	IND	1600	CIV	1811	CIV	81.8	IND	70.3	GTM	30.7	GIN	36.2
55	LKA	580	CHN	1623	HND	2078	PAK	87.0	PAK	68.6	ZWE	42.8	CIV	46.1
54	HND	634	GIN	1669	LSO	2273	CHN	83.8	CHN	65.4	CIV	67.9	CHN	48.6
53	ZWE	676	BOL	2017	GIN	2303	GIN	67.1	ZWE	43.2	CHN	70.5	PAK	52.2
52	CIV	693	LSO	2098	BOL	2325	ZWE	61.1	GIN	53.2	IND	78.9	IND	54.2
51	LSO	748	IDN	2156	LKA	2463	BOL	76.4	BOL	58.0	PAK	76.8	GTM	25.7
50	IDN	761	HND	2249	IDN	2721	GTM	54.2	GTM	40.9	BOL	60.0	BOL	40.8
49	BOL	805	LKA	2307	ZWE	2818	DOM	67.7	DOM	49.5	PAN	30.8	DOM	32.9
48	EGY	967	ZWE	2620	PHL	2993	LKA	88.0	PHL	55.3	DOM	48.7	PHL	38.2
47	PHL	1113	EGY	2840	DOM	3019	PHL	75.7	LKA	69.9	PHL	60.5	PAN	27.8
46	MAR	1285	ECU	2944	EGY	3161	IDN	86.6	IDN	66.9	ECU	54.6	LKA	53.7
45	DOM	1333	GTM	3211	JOR	3274	ECU	74.0	ECU	56.1	BRA	31.8	ECU	39.0
44	GTM	1359	MAR	3222	MAR	3415	JOR	78.8	JOR	59.3	LKA	78.4	IDN	50.3
43	ECU	1436	JAM	3327	ECU	3444	PAN	56.1	PER	57.2	IDN	76.8	JOR	42.2
42	JOR	1465	JOR	3628	PER	3478	PER	76.9	PAN	43.5	JOR	64.3	PER	40.1
41	ROM	1570	PER	3651	GTM	3524	EGY	86.6	MAR	60.8	ZAF	28.6	JAM	41.1
40	DZA	1595	DOM	3721	JAM	3611	MAR	80.4	JAM	58.2	PER	61.9	MAR	43.7
39	BGR	1607	PHL	3837	COL	4680	JAM	77.3	EGY	68.0	COL	46.6	COL	32.2
38	JAM	1624	PAN	4265	CRI	4713	COL	67.6	COL	48.7	JAM	61.7	BRA	25.3
37	TUN	1797	TUN	4370	PAN	4742	BRA	52.9	THA	51.2	MAR	66.3	EGY	51.5
36	PER	1882	THA	4393	THA	4772	THA	67.8	BRA	40.4	THA	48.2	CHL	28.1

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Table 5: *continued*

Rank	GNP/cap (exchange rate)		GNI/cap (PPP)		GNP/cap (PPP)		Atkinson ($\epsilon = 1$) (% of GNP/cap, PPP)		Sen (% of GNP/cap, PPP)		Atkinson ($\epsilon = 2$) (% of GNP/cap, PPP)		Dagum (% of GNP/cap, PPP)	
35	PRY	1900	PRY	4648	TUN	4773	CRI	71.0	CRI	53.9	CRI	50.5	THA	34.4
34	THA	2013	DZA	5042	DZA	4798	CHL	61.8	CHL	43.9	EGY	76.4	ZAF	23.2
33	COL	2119	MYS	5262	ROM	4811	TUN	78.5	ZAF	37.7	CHL	42.1	CRI	36.9
32	PAN	2432	CHL	5436	PRY	5072	ZAF	51.3	TUN	59.8	MEX	40.9	TUN	42.6
31	POL	2611	TUR	5668	CHL	5791	DZA	80.4	DZA	61.3	TUN	62.7	MEX	29.0
30	TUR	2673	VEN	5680	TUR	5800	PRY	78.6	PRY	60.3	PRY	62.9	DZA	44.2
29	CRI	2982	CRI	5853	BRA	6052	TUR	74.8	MEX	45.0	DZA	66.7	MYS	34.8
28	MUS	2988	BGR	6190	POL	6225	MYS	70.1	MYS	51.7	MYS	51.8	PRY	43.1
27	MYS	3109	POL	6213	MYS	6247	MEX	61.9	TUR	55.9	TUR	57.7	TUR	38.8
26	MEX	3143	BRA	6271	BGR[a]	6575	ROM	92.3	ROM	76.6	VEN	55.7	VEN	38.8
25	CHL	3237	MUS	6468	VEN	6745	VEN	74.0	VEN	55.9	ROM	85.0	ROM	62.1
24	VEN	3344	MEX	7152	MEX	7093	POL	90.6	POL	73.8	POL	82.2	POL	58.4
23	ZAF	4026	ROM	7233	ZAF	7476	BGR	92.3	BGR	75.5	BGR	85.5	MUS	43.2
22	BRA	4108	ZAF	9215	MUS	8980	MUS	79.4	MUS	60.4	MUS	63.8	BGR	60.6
21	HUN	4740	KOR	10293	HUN	9180	KOR	84.3	KOR	66.4	KOR	71.9	KOR	49.7
20	KOR	8119	HUN	10467	KOR	9949	HUN	92.6	HUN	76.7	IRL	57.9	PRT	46.2
19	PRT	10082	PRT	12878	PRT	12229	PRT	80.6	PRT	63.2	PRT	64.2	HUN	62.2
18	GRC	11265	IRL	13538	GRC	12292	IRL	76.6	GRC	64.8	HUN	86.2	GRC	47.9
17	IRL	14124	GRC	13643	IRL	13031	GRC	82.3	IRL	65.4	GRC	67.1	IRL	48.6
16	ESP	14317	ESP	14848	ESP	14436	NZL	80.8	NZL	63.4	NZL	64.5	NZL	46.4
15	NZL	14442	SGP	15219	NZL	15219	ESP	87.3	ESP	69.7	AUS	55.7	SGP	41.8
14	AUS	18185	NZL	15485	GBR	18135	AUS	75.1	SGP	59.0	ESP	76.4	ESP	53.5
13	ITA	18236	AUS	19044	SGP	18425	SGP	79.1	AUS	58.3	SGP	64.7	AUS	41.1
12	GBR	18253	GBR	19171	ITA	19015	GBR	85.4	HKG	58.0	HKG	62.0	HKG	40.8
11	SGP	18356	HKG	19392	AUS	19086	HKG	76.9	GBR	67.7	GBR	73.7	GBR	51.2
10	CAN	18807	ITA	19902	NLD	19652	NOR	82.8	ITA	67.3	NOR	67.6	ITA	50.7
9	HKG	19187	FIN	20064	FIN	19720	ITA	87.8	NOR	66.7	DNK	64.1	NOR	50.0
8	NLD	25737	NLD	20354	BEL	19729	NLD	87.0	SWE	67.5	NLD	74.0	SWE	50.9
7	BEL	26358	SWE	20412	NOR	19837	SWE	85.9	NLD	70.6	ITA	77.4	DNK	50.2
6	FIN	26614	DNK	21942	SWE	20026	DNK	82.1	DNK	66.9	SWE	73.5	NLD	54.6
5	USA	26721	NOR	21965	HKG	20827	FIN	89.4	BEL	73.4	USA	57.5	BEL	57.9
4	SWE	26836	BEL	22336	DNK	21151	BEL	89.7	FIN	73.9	FIN	78.4	FIN	58.6

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Table 5: *continued*

Rank	GNP/cap (exchange rate)		GNI/cap (PPP)		GNP/cap (PPP)		Atkinson ($\epsilon = 1$) (% of GNP/cap, PPP)		Sen (% of GNP/cap, PPP)		Atkinson ($\epsilon = 2$) (% of GNP/cap, PPP)		Dagum (% of GNP/cap, PPP)	
3	NOR	28499	CAN	22486	CAN	21548	CAN	88.4	CAN	72.4	BEL	79.9	USA	45.1
2	DNK	31475	USA	27169	USA	26450	USA	77.0	USA	62.2	CAN	76.6	CAN	56.8
1	LUX	46827	LUX	28861	LUX	31339	LUX	89.5	LUX	72.9	LUX	80.1	LUX	57.3

Notes: For definition of columns, see Tables 2 and 4.
[a]: Income data of Bulgaria (BGR) from 1991.

Table 6: **Welfare Measures 1998**

Rank	GNP/cap* (exchange rate)		GNI/cap** (PPP)		GNP/cap*** (PPP)		Atkinson ($\epsilon = 1$) (% of GNP/cap, PPP)		Sen (% of GNP/cap, PPP)		Atkinson ($\epsilon = 2$) (% of GNP/cap, PPP)		Dagum (% of GNP/cap, PPP)	
77	ETH	109	TZA	466	TZA	461	GNB	57.4	GNB	43.8	GNB	32.1	GNB	28.0
76	BDI	148	BDI	563	ETH	543	TZA	81.0	TZA	61.9	CAF	28.5	TZA	44.8
75	GNB	164	ETH	573	BDI	584	ETH	80.2	ETH	60.0	NER	36.8	ETH	42.9
74	MOZ	181	GNB	593	GNB	593	BDI	85.2	CAF	38.7	TZA	67.3	CAF	24.0
73	TZA	187	MLI	690	ZMB	809	CAF	51.2	BDI	66.7	ETH	67.2	NER	32.8
72	NER	219	ZMB	690	NER	820	NER	62.5	NER	49.4	ZMB	49.3	ZMB	33.5
71	NPL	227	YEM	699	MLI	863	ZMB	68.5	ZMB	50.2	BDI	73.7	MLI	32.9
70	NGA	233	MOZ	709	YEM	898	MLI	68.3	MLI	49.5	MLI	50.4	BDI	50.0
69	MDG	237	NER	738	UGA	899	NGA	68.4	NGA	49.4	NGA	49.8	NGA	32.8
68	BFA	262	MDG	738	NGA	927	BFA	71.3	BFA	51.8	BFA	55.3	BFA	35.0
67	MLI	272	NGA	748	BFA	938	UGA	80.4	GMB	52.2	GMB	52.0	GMB	35.3
66	YEM	272	BFA	874	MOZ	939	GMB	70.8	UGA	60.8	UGA	66.2	UGA	43.7
65	KHM	278	KEN	971	CAF	974	MOZ	79.8	MOZ	60.4	MOZ	65.5	MOZ	43.3
64	VNM	310	CAF	1049	GMB	1026	YEM	92.6	KEN	55.5	LSO	34.2	KEN	38.4
63	UGA	340	UGA	1059	GHA	1212	KEN	74.4	YEM	78.2	KEN	57.0	NIC	33.0
62	CAF	342	NPL	1205	MRT	1227	MRT	79.8	MRT	61.1	NIC	49.0	LSO	26.6
61	KEN	342	KHM	1273	KEN	1253	KHM	79.8	NIC	49.7	YEM	85.1	MRT	43.9
60	GMB	354	SEN	1302	KHM	1271	NIC	68.1	KHM	59.6	MRT	64.7	KHM	42.5
59	BGD	369	LAO	1321	MNG[a]	1318	GHA	85.8	GHA	67.3	NAM	19.1	YEM	64.2
58	ZMB	373	BGD	1379	LAO[a]	1362	MNG	84.7	LSO	42.1	KHM	66.3	GHA	50.7
57	GHA	402	GMB	1428	NPL	1406	LSO	56.1	MNG	66.8	GHA	75.0	SEN	41.6

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Table 6: *continued*

Rank	GNP/cap* (exchange rate)		GNI/cap** (PPP)		GNP/cap*** (PPP)		Atkinson ($\epsilon = 1$) (% of GNP/cap, PPP)		Sen (% of GNP/cap, PPP)		Atkinson ($\epsilon = 2$) (% of GNP/cap, PPP)		Dagum (% of GNP/cap, PPP)	
56	NIC	421	CIV	1477	SEN	1505	NPL	82.7	SEN	58.7	MNG	72.1	NAM	14.7
55	LAO	428	MRT	1477	NIC	1512	SEN	78.5	NPL	63.3	SEN	64.0	HND	31.0
54	IND	436	MNG	1593	BGD	1586	LAO	88.1	LAO	69.6	HND	46.6	NPL	46.3
53	MNG	453	PAK	1681	VNM[b]	1812	BGD	85.5	HND	47.4	NPL	70.5	MNG	50.2
52	MRT	468	GHA	1710	CIV	1856	HND	66.5	BGD	66.4	LAO	79.1	LAO	53.4
51	PAK	513	VNM	1719	PAK	1864	VNM	83.4	NAM	25.7	BGD	75.0	BGD	49.7
50	SEN	578	GIN	1778	LSO	1992	CIV	82.2	VNM	63.9	CIV	69.0	VNM	47.0
49	GIN	600	NIC	1826	HND	2096	NAM	36.7	CIV	63.3	VNM	71.7	CIV	46.3
48	LSO	692	IND	2021	MDG	2190	PAK	87.6	MDG	56.6	MDG	60.5	MDG	39.4
47	HND	703	PNG	2059	IND	2267	MDG	76.2	PAK	68.8	PNG	49.7	PNG	32.5
46	CHN	726	HND	2273	GIN	2715	IND	82.8	PNG	49.1	PAK	78.4	PAK	52.4
45	CIV	745	LSO	2331	PNG	2802	PNG	67.8	IND	62.2	IND	71.3	IND	45.1
44	GUY	775	IDN	2574	LKA	3040	GIN	79.0	GIN	59.7	GIN	64.4	GIN	42.6
43	LKA	794	ECU	2963	GUY	3156	PHL	72.9	PHL	53.8	PHL	56.2	PHL	36.8
42	IDN	922	LKA	3002	CHN	3218	GUY	79.2	GUY	59.8	CHN	62.7	GUY	42.6
41	PNG	975	EGY	3177	IDN	3329	CHN	78.6	CHN	60.2	GUY	64.4	CHN	43.1
40	EGY	1183	CHN	3206	PHL	3403	LKA	84.4	LKA	65.6	ECU	58.2	ECU	39.1
39	PHL	1206	JAM	3254	ECU	3599	ECU	75.0	ECU	56.3	LKA	72.9	LKA	48.8
38	ROM	1316	MAR	3283	JAM	3602	IDN	84.9	IDN	65.8	PER	52.5	MAR	43.4
37	MAR	1378	GUY	3371	MAR	3720	MAR	79.4	MAR	60.5	MAR	65.1	PER	36.8
36	BGR	1395	JOR	3643	JOR	3809	JAM	82.5	JAM	63.6	IDN	73.9	IDN	49.1
35	DZA	1502	PHL	3779	EGY	4003	JOR	82.9	PER	53.8	JAM	69.3	JAM	46.6
34	ECU	1584	PER	4303	NAM	4339	PER	71.7	JOR	63.6	ZAF	35.3	JOR	46.6
33	JOR	1644	DZA	4566	ROM	4382	EGY	89.1	EGY	71.1	PAN	46.1	ZAF	25.5
32	JAM	1728	BGR	4711	PER	4431	DZA	83.0	PAN	51.5	JOR	70.6	PAN	34.7
31	NAM	2175	PAN	5158	DZA	4572	PAN	67.7	ZAF	40.7	BRA	44.1	BRA	31.8
30	PER	2339	THA	5479	BGR	5191	ROM	88.7	DZA	64.7	DZA	69.6	DZA	47.8
29	THA	2602	NAM	5741	PAN	5612	ZAF	55.5	ROM	71.3	EGY	80.5	EGY	55.2
28	PAN	3087	ROM	5935	THA	6057	BRA	65.1	BRA	48.3	ROM	78.9	ROM	55.4
27	TUR	3329	BRA	6606	BRA	6567	BGR	87.4	THA	58.6	MEX	48.3	THA	41.4
26	MEX	3496	TUR	6615	TUR	7052	THA	77.8	BGR	72.7	THA	63.0	MEX	33.1
25	POL	3677	MEX	7577	ZAF	7262	MEX	67.6	MEX	49.7	BGR	77.5	CHL	29.2

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Table 6: *continued*

Rank	GNP/cap* (exchange rate)		GNI/cap** (PPP)		GNP/cap*** (PPP)		Atkinson ($\epsilon = 1$) (% of GNP/cap, PPP)		Sen (% of GNP/cap, PPP)		Atkinson ($\epsilon = 2$) (% of GNP/cap, PPP)		Dagum (% of GNP/cap, PPP)	
24	ZAF	3910	POL	7713	MEX	7614	TUR	77.5	TUR	58.5	CHL	43.4	TUR	41.3
23	MUS	4001	CHL	8325	POL	8401	CHL	63.0	CHL	45.2	TUR	61.6	BGR	57.1
22	BRA	4545	ZAF	8374	HUN	9100	POL	85.9	POL	66.3	POL	74.9	POL	49.6
21	HUN	4805	MUS	8461	CHL	9545	HUN	91.7	HUN	74.7	BHS	47.6	HUN	59.6
20	CHL	5401	HUN	10074	MUS	12525	MUS	82.1	MUS	63.3	HUN	84.2	MUS	46.3
19	KOR	11084	KOR	13551	KOR	13205	BHS	70.8	BHS	54.7	MUS	68.2	BHS	37.7
18	BHS	12045	BHS	14261	PRT	14366	KOR	86.1	KOR	68.4	NZL	57.0	PRT	47.5
17	PRT	12062	PRT	14843	BHS[a]	15869	PRT	82.7	PRT	64.4	PRT	67.5	KOR	52.0
16	NZL	15585	NZL	16242	NZL	16328	NZL	76.5	NZL	59.8	KOR	74.1	NZL	42.6
15	ESP	16572	ESP	16553	ESP	16679	ESP	84.6	ESP	67.0	ESP	71.4	ESP	50.4
14	ITA	20078	SWE	20682	ITA	20960	ITA	83.6	HKG	55.0	HKG	56.8	HKG	37.9
13	CAN	20698	FIN	20818	FIN	21208	GBR	83.8	ITA	65.8	ITA	69.5	ITA	49.0
12	GBR	21407	ITA	20876	FRA	21313	HKG	74.8	GBR	65.5	GBR	70.8	GBR	48.7
11	AUS	22592	GBR	20915	GBR	21556	FRA	88.7	FRA	71.2	DNK	63.6	DNK	45.6
10	HKG	22760	HKG	21352	SWE	21717	FIN	92.8	DNK	62.7	FRA	79.2	FRA	55.3
9	SWE	28792	FRA	21546	BEL	22471	DNK	80.2	FIN	76.4	AUS	73.1	AUS	52.6
8	FRA	28921	AUS	22314	NLD	23225	SWE	93.0	AUS	68.9	CAN	75.0	CAN	53.3
7	FIN	29121	NLD	22712	AUS	23837	BEL	91.1	CAN	69.5	FIN	86.4	FIN	61.8
6	BEL	29878	CAN	23470	CAN	23987	AUS	86.0	BEL	75.0	BEL	82.8	BEL	60.0
5	NLD	30209	BEL	23975	HKG	24902	CAN	86.9	SWE	77.9	SWE	86.2	NLD	59.6
4	USA	30592	DNK	24218	DNK	25118	NLD	90.5	NLD	74.7	NLD	81.4	SWE	63.8
3	DNK	37004	NOR	26977	NOR	26403	NOR	92.1	USA	62.8	USA	65.3	USA	45.8
2	NOR	37538	USA	29852	USA	31167	USA	80.9	NOR	76.2	NOR	84.6	NOR	61.6
1	LUX	48749	LUX	37167	LUX	38973	LUX	92.4	LUX	76.5	LUX	85.7	LUX	61.9

Notes: All rankings are based on the absolute values of the well-being indicator.
The last four columns present the ratios of the respective adjusted income to unadjusted GNP per capita, PPP.
*: GNP per capita, constant 1996 US-Dollars (WDI, 1999, 2001).
**: Real GNI per capita, 1996 prices (WDI, 2002).
***: Real GNP per capita, 1996 prices (Summers and Heston, 1991; Heston, Summers, and Aten, 2001).
[a]: Income data of Mongolia (MNG), Laos (LAO), and Bahamas (BHS) from 1996.
[b]: Income data of Vietnam (VNM) from 1997.

Table 7: **Test of Sensitivity**

Year	Country	Gini used	Based on	Alternative Gini	Based on	Changes in Ranking[a] Atkinson ($\epsilon = 1$)	Sen	Atkinson ($\epsilon = 2$)	Dagum
1960	Brazil	53.0	I G H	54.0	I G P	+2	-	+5	-2
	Chile	45.6	I G H	44.0	I G P	-	-	+1	+1
	Jamaica	54.3	I G H	56.0	I G P	-8	-1	-13	-2
	Mexico	53.0	I G H	55.5	I G H	-	-1	-2	-1
	Philippines	49.7	I G H	48.0	I G P	-	-	+1	+1
	Sri Lanka	47.0	I G H	44.0	I G P	-	-	-	+2
	Sweden	37.9	I G H	33.4	I N H	-	+1	+2	+1
1970	Mexico	57.7	I G H	52.2	I G H	+3	+1	+2	+1
	Sierra Leone	60.8	I G H	56.0	I G P	-	-	+2	+1
	Sweden	31.4	I G H	27.3	I N H	+1	+1	+3	+1
1980	Australia	40.0	I G H	38.6	I G F[b]	+1	+2	-	-
	Canada	31.8	I G F	36.4	I G F[b]	-4	-3	-6	-6
	France	34.9	I G H	31.7	I N H	-1	-	+3	+2
	Norway	31.2	I N H	26.2	I N H[b]	+6	+4	+8	+4
	Spain	34.2	I G H[c]	26.8	E N H	+2	+2	+2	+2
	Sweden	29.4	I G H	32.4	I N H	-2	-2	-2	-2
1990	Algeria	38.7	E N P	40.1	E - H[d]	-	-1	-2	-3
	Australia	37.3	I G H	32.8	I N H	+1	+2	+1	+3
	Brazil	59.6	I G P	63.4	I G P	-1	-1	-1	-6
	Chile	56.1	I - -[d]	51.9	I G P	-	+3	-	+4
	China	34.6	I G P	33.5	I - H[d]	-	-	-	-
	Denmark	33.1	I G H	39.0	I G F	-3	-2	-2	-4
	Finland	26.1	I N H	20.2	I N Heq[c]	+1	+1	+4	+3
	Ghana	36.7	E N P	33.9	E - Hpc	-	-	-	-
	Ireland	34.6	I N H	38.9	I G H	-	-2	-	-1
	Jordan	40.7	E N P	43.4	E - Hpc[d]	-1	-2	-2	-2
	Kenya	54.4	E N P	57.5	E - Hpc[d]	-	-	-	+1
	Mexico	55.0	I G P	46.9	I G H	+2	+2	+6	+5
	Nigeria	41.2	E N P	45.0	E - Hpc[d]	-2	-1	-2	-1
	Pakistan	31.4	E N H	32.4	I G H	+1	-	-	-
	Philippines	44.7	I G H[c]	45.7	I G P	-1	-	-1	-
	Sweden	29.0	I G H	32.5	I N H	+1	-2	-1	-2

continued on next page

Table 7: *continued*

Year	Country	Gini used	Based on	Alternative Gini	Based on	Changes in Ranking[a] Atkinson ($\epsilon = 1$)	Sen	Atkinson ($\epsilon = 2$)	Dagum
	Uganda	33.0	E N Heq	44.4	E - H[d]	-	-2	-3	-2
	Zambia	48.3	E - H[d]	43.5	E N P	+3	+1	+4	+1
1998	Denmark	37.4	I G F[c]	33.7	I N F[c]	-	-	+1	-
	Madagascar	43.4	E N P	46.0	E - Hpc[d]	-	-1	-1	-1
	Turkey	41.5	E - Hpc[d]	49.0	I N H[c]	-1	-2	-1	-4
	Uganda	39.2	E - Hpc	40.8	E - P	-	-	-	-

[a]: A positive sign corresponds to a higher rank, a negative one indicates a worsening in ranking.
Inequality data applied is predominantly provided by Deininger and Squire (1996). Additional data sources are indicated as follows.
[b]: Data originally provided by Luxembourg Income Study.
[c]: See WIID (2000) for further information on data source.
[d]: Data taken from the World Bank (World Bank, 2002a).
Income concept is either income (I) or expenditure (E), and both concepts can be gross (G) or net (N). Unit of reference can be per person (P), household (H), or household per capita (Hpc). In a few cases an equivalence scale was applied to calculate the data (Heq). If any component is not reported or unknown, - is shown.

Table 8: **Determinants of Gini Coefficients**

	(1)		**(2)**	
Expenditure	-3.85**	(0.39)	-3.57**	(0.38)
Net income	-1.84**	(0.27)	1.38**	(0.48)
Unknown income	1.24	(1.64)	1.39	(1.61)
Household	1.06**	(0.28)	1.14**	(0.27)
Family	0.64	(0.45)	0.70	(0.44)
Unknown reference unit	-1.24	(1.62)	-1.19	(1.60)
Equivalized	-4.65**	(0.30)	-4.35**	(0.29)
Primary source unknown	1.79**	(0.63)	1.88**	(0.62)
No consistent source	-0.39	(0.25)	-0.44	(0.24)
OECD * Net income	-		-4.64**	(0.56)
Intercept	36.08**	(0.27)	35.92**	(0.26)
N	2033		2033	
R^2	0.21		0.23	

Significance levels: $*$: 5% $**$: 1%; Standard errors in parentheses.

Table 9: **Change in Rankings Due to Adjusted Gini Coefficients**

	No change	**1 Rank**	**2 Ranks**	**3 Ranks**	**4+ Ranks**
Sen measure					
1960	35	7	0	0	1
1970	28	18	2	0	0
1980	26	22	6	2	1
1990	42	22	3	3	0
1998	43	21	6	1	1
Dagum measure					
1960	24	12	7	0	0
1970	29	14	1	4	0
1980	26	21	7	3	0
1990	31	21	15	3	0
1998	35	30	6	0	1

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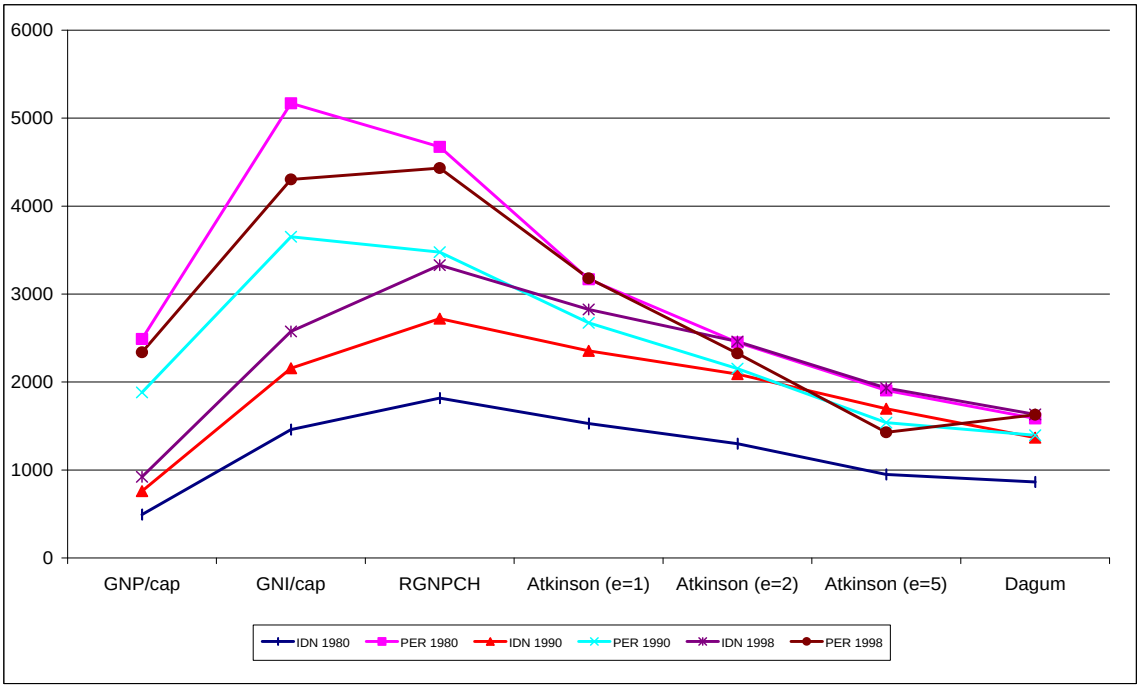
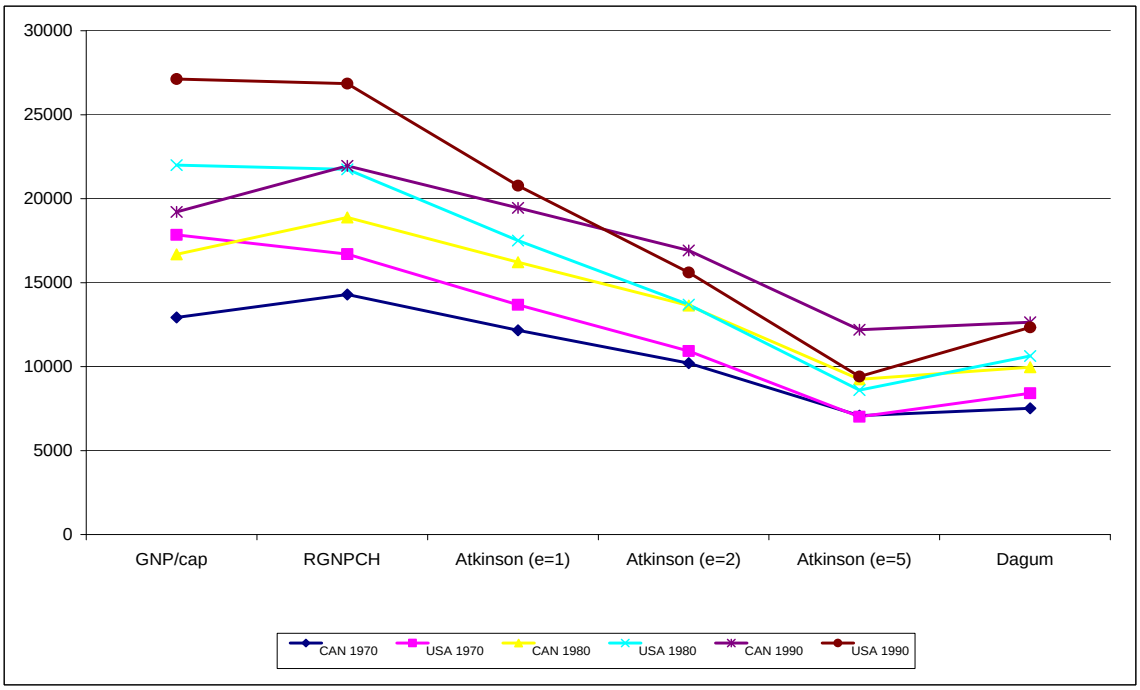
Figure 1: **Welfare Comparison: Indonesia versus Peru, 1980-1998**



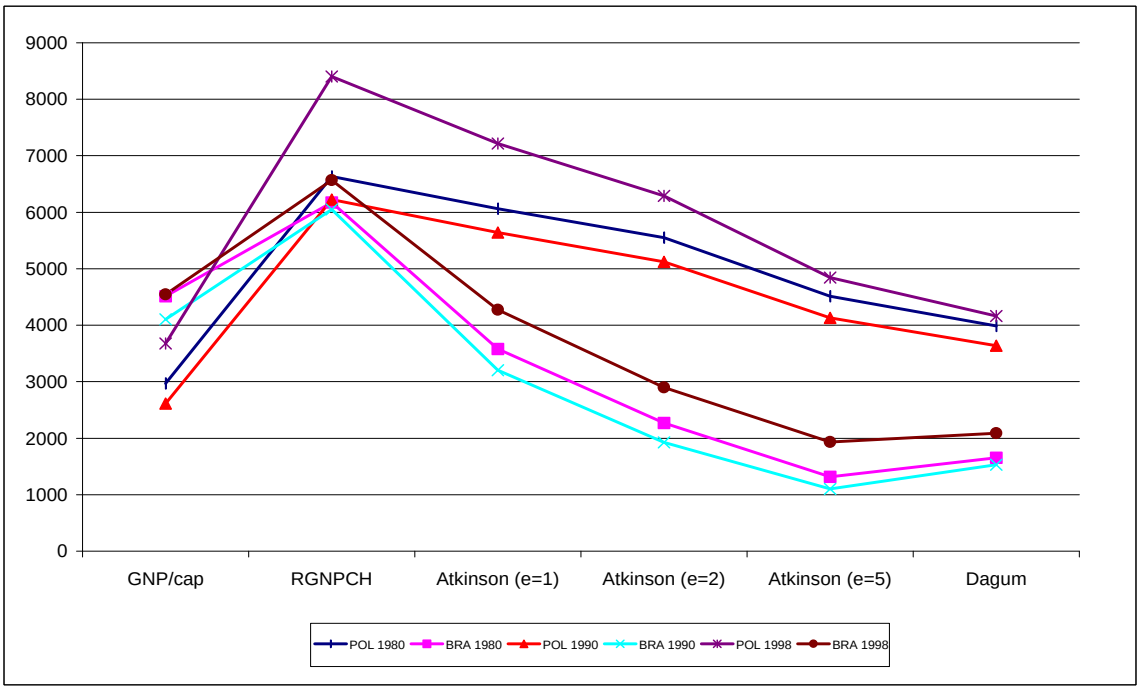
Notes: GNP/cap: GNP per capita, constant 1996 US-Dollars (WDI, 1999, 2001). GNI/cap: Real GNI per capita, 1996 prices (WDI, 2002). RGNPCH: Real GNP per capita, 1996 prices (Summers and Heston, 1991; Heston, Summers, and Aten, 2002).

Figure 2: **Welfare Comparison: Canada versus USA, 1970-1990**



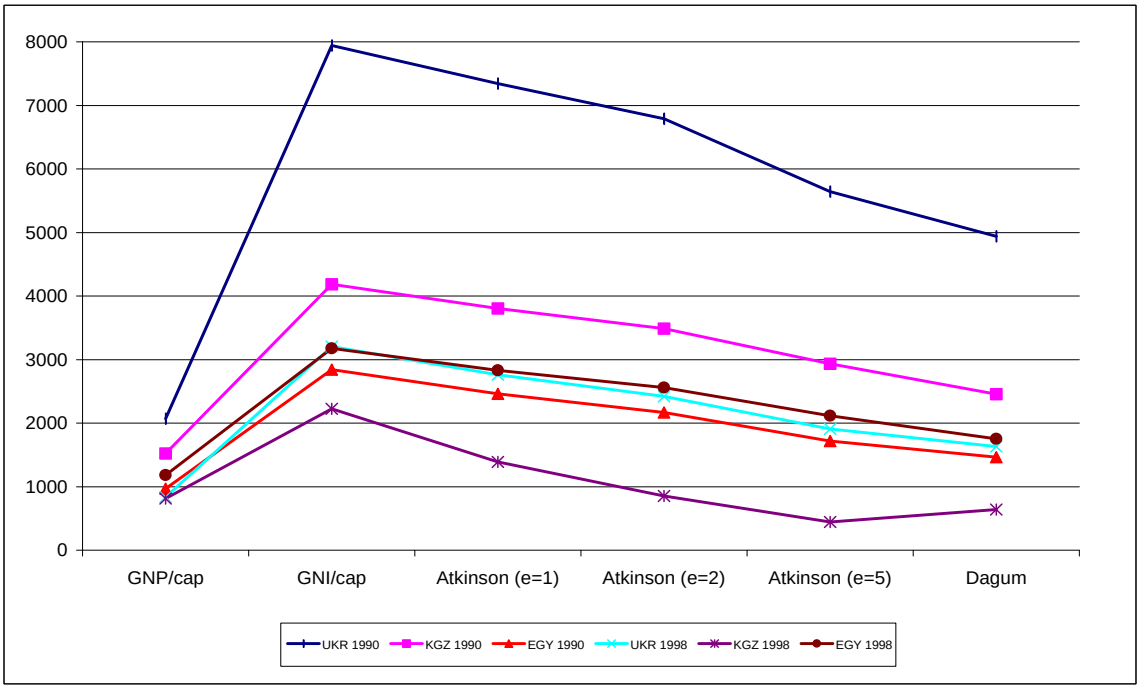
Notes: For definition of incomes, see Figure 1.

Figure 3: **Welfare Comparison: Poland versus Brazil, 1980-1998**



Notes: For definition of incomes, see Figure 1.

Figure 4: **Welfare Comparison: Ukraine, Kygizstan, and Egypt 1990-1998**



Notes: The income data used are from WDI (2002). See text for details.